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On February 6th.—481 to 490.—H. Elder. Railway brakes.—J. C. Baxter. Boilers and engines or apparatus for obtaining motive power by means of elastic fluids.—W. C. Thwaites. Apparatus for securing watches and valuables.—P. Frankenstein. Waterproof overcoats.—J. J. Harrop. Tin-lined lead piping, and tin and lead piping, soil and water pipes, and apparatus employed, and covering of telegraph cables with lead.—S. Ford. Prime movers actuated by the explosive force of mixtures of gases.—J. Ledbrook and J. H. Mills. Self-adjusting all kinds of railway signal and other wires.—C. W. Kayser. Steam, hydraulic, blowing, pumping, or water engines (com.)—J. W. Moore and J. Norman. Harness saddles or "pads."—J. Barnett. Apparatus for obtaining and applying motive power.

On February 7th.—491 to 503.—C. C. Cramp. Construction of tramways and apparatuses connected therewith.—W. S. Von Essen. Apparatus for cleaning tubes of steam boilers.—J. Hock. Motor engines worked by the combustion of petroleum or other liquid hydrocarbons.—F. W. Webb. Mechanism or arrangements for actuating railway points and signals.—M. Benson. Welding copper (com.)—R. Quin. Cases for cigars and similarly or approximately formed articles.—L. Rose. Stopper for bottles for containing gases or gases combined with liquids, such as aërated beverages, whereby an improved mode of filling, stoppering, and opening such bottles can be effected.—G. Campion. Harrows and such like implements employed in cultivating land.—F. G. Underhay. Bib-cocks or cocks for drawing off water.—G. A. Everett. Liquid meters (com.)—J. Baron, T. Richmond, and W. Richmond. Looms for weaving.—W. J. Curtis. Railway points or switches.—W. W. Dunn. Machinery for drilling or boring rocks and other hard substances, partly applicable to other purposes.

On February 9th.—504 to 515.—H. Chatwin, Finger boards, suitable for pianofortes, organs. harmoniums, and other such like instruments.—J. G. Tongue. Preservation of meat or animal substances (com.)—F. H. Atkins. Filters for ships' tanks and other purposes.—B. Blackburn and A. B. Blackburn. Apparatus for working steam engines expansively.—W. Garton. Brewing.—R. M. Marchant. Motive-power engines, and apparatus connected therewith.—C. Espir. Apparatus for cutting down trees (com.)—H. Webb. Sewing machines (com.)—J. N. Adorno.

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On February 10th.—516 to 527.—V. Pendred. Boilers for generating steam. (Complete specification.)—J. B. Orr. Obtaining a white pigment, and the process employed therefor.—H. A. Bonneville. Fire alarm (com.)—C. H. Touaillon. Stopping teeth (com.) (Complete specification).—S. G. Cox. Pills.—F. Bale. Production of common salt.—M. McFeely. Process of combining "charger and heater" in the manufacture of spirits, to lessen the consumption of coal.—A. Lighbody and W. Lighbody. Lamp burners.—R. S. Gold. Hats.—J. Deléon. Building materials.—G. Hindley. Apparatus for cutting and dressing stone or other similar material.—D. Greig and M. Eyth. Machinery for towing by fixed ropes.

On February 11th.—528 to 535.—A. S. Wallis. Checking the amounts taken as fares by conductors of tramway cars, omnibuses, and such like public vehicles.—J. Craps and J. Deribon. Non-conducting composition or mastic for preventing the radiation of heat from boilers and other similar apparatus (com.)—J. T. Dann. Cooking utensils (com.)—W. Johnson. Apparatus for compressing air or gases.—J. H. Lynde. Tramways.—J. F. Wiles. Apparatus for propelling ships and other vessels.—M. Wilson. Stench-traps.—F. Render. Apparatus for elevating or transferring wheat and other such grain from ships or other vessels or from other situations.

On February 12th.—536 to 547.—J. Kiddill, jun. Fountain for use in game preserves, poultry yards, aviaries, and other places.—J. Harrison, W. Loynd, and R. H. Clayton. Air-pumps or vacuum-engines.—J. Campbell & W. C. Somerville. Mortar mills or other grinding mills of a similar nature, and road rollers.—W. R. Lake. Apparatus for stretching boots and shoes (com.)—T. Blackburn. Manufacture of size.—B. Harlow. Potters' or earthenware printers' stove or hot-plate and method of heating the same.—L. H. Dethiou. Buckles without prongs, with a pressure in continuity through a movement of friction.—A. Allan. Stud or fastening for securing the ends of bale bands.—J. Hicks. Apparatus for saving life at sea.—J. Leber. Machines for cutting paper and pasteboard.—J. T. Duncan. Precipitating metallic copper from its solutions, and obtaining a utilising material from the agent employed for the purpose (com.)—A. M. Clark. Clock (com.)

On February 13th.—548 to 558.—C. W. Vosper. Shuttles applicable to all kinds of sewing machines worked by a shuttle.—B. C. Lauth. Manufacture of cast-metal rolls, pipes, wheels, and other like articles, chiefly applicable to the manufacture of rolls and other parts of machinery for rolling metals (com.)—T. Perks. Brooches, shawl pins, nursery pins, and other like fastenings.—W. Buckingham. Heating apparatus for buildings, dwelling houses, also for steam-boilers or any such like purpose or purposes.—J. Goater. Arranging and combining the materials used in the manufacture and construction of fire and burglar proof safes, strong boxes, and other receptacles, and the parts connected therewith.—H. Pochet. Means and apparatus for shutting bottles, flagons, bidons, cans, &c.—A. Noble. Mode of giving rotation to projectiles and stopping windage in ordnance.—J. Clegg and R. Taylor. Mules and twiners for spinning and doubling.—W. B. Haigh and A. Bleasby. Furnaces or cupolas used for melting iron and other metals.—W. C. Nangle. Composition and preparation of preservative and antifouling compounds or paints for coating metals and other substances.—J. J. Shedlock. Apparatus for containing pigments, inks, gums, and other like materials.

On February 14th.—559 to 574.—E. Meldrum. Open fire-places.—J. B. Dalzell. Signalling apparatus for railways.—N. Thompson. Means for stopping bottles, jars, and other hollow articles, which invention is applicable to means for connecting together tubes and other articles.—A. Smith and G. W. Hannam. Preparing peat for various uses and purposes by washing, straining, and precipitation.—C. A. Terrey. Method of setting diamonds in drills and other boring and cutting tools.—J. L. Clark and E. J. Hill. Railway signalling apparatus.—F. Hazeldine. Valve or tap for liquids and other purposes.—W. W. Box. Apparatus used in the manufacture of gas.—W. Richards. Regulating the supply of fluids and liquids for the manufacture of illuminating gas, and for the apparatus employed therein.—A. F. Corbett. Production of artificial fuel.—D. Smith, T. Henderson, and W. P. Thompson. Apparatus for supplying fuel to steam boiler and other furnaces.—W. R. Lake. Paddle-wheels for steam-boats (com.)—H. S. Gregory. Seed and manure drills or distributors.—W. Palmer and C. Hopkinson. Flour-dressing by the use of improved mechanism.—M. Mirfield and J. Scott. Machinery employed for combing wool and other fibres.—J. Knowles. Machinery or apparatus for preparing cotton and other fibrous substances.

On February 16th.—575 to 584.—A. R. Burman and M. de Frece. Portable ether and perfume sprayers.—H. Aitken. Blast furnaces and cupolas, and recovering or collecting the products thereof.—R. Thornton. Construction of machinery for cutting corks.—E. Holden. Preparing wool and other similar fibres for the combing process.—W. Clark. Invalid bedsteads (com.)—J. D. Napier and R. D. Napier. Winches and other hoisting or hauling machines.—J. Harvey and G. Pryer. System or method and means of applying, adapting, and setting sails for the better propulsion of vessels.—A. M. Dix. Methods of effecting locomotion, by which vehicles can be moved on common roads, tramroads, and railroads.—W. Needham. Method of signalling upon railways.—Sir D. L. Salomons. Mechanism or apparatus for indicating the speed of revolving shafts.

On February 17th.—585 to 600.—W. R. Lake. Rotary hay-tedding machines (com.)—H. Bradley. Tell-tale money-box.—G. A. Wilson. Rotary web printing machines.—D. Morton. Construction of the furnaces of steam boilers for the purpose of consuming smoke and economizing fuel.—W. Henry. Lighting and heating with carburetted hydrogen gas.—G. Ellison. Apparatus for communication between passengers, guard, and driver in railway trains, also the means of working the brakes for retarding or stopping such trains.—L. R. R. Comte de Beaurepaire de Louvagny. Purifying alcohol, and the apparatus employed therein.—G. H. Smith. Apparatus for clearing snow and other matters from tramways and railways (com.)—W. Clark. Steam and sailing vessels (com.) (Complete specification.)—J. H. Johnson. Application of heated air, and the machinery or apparatus employed therein (com.)—J. H. Johnson. Production of salicylic acid and of the isomeric and homologous acids (com.) (Complete specification.)—C. J. Wollaston. Railway recording apparatus.—F. Arnheim. Lithographic presses (com.)—E. H. Yarrow. Manufacture of gas, and the apparatus connected therewith.—S. de la G. Williams, jun., and H. Y. D. Scott.—Kilns for burning lime and cement.—S. Sanderson and A. Proctor.—Stoves, grates, or fire-places.

On February 18th.—601 to 621.—C. McBeath. Retorts and apparatus connected therewith, for the purpose of distillation and calcination of minerals, parts of which are applicable to other purposes.—G. Griffiths. Sewing machine shuttles and reels.—M. Baile. Multiple tool.—J. Kitchin. Boilers and steam generators.—C. D. Abel. Gas-motor engines (com.)—B. Hunt. Grinding mills (com.)—A. L. Freund. Method of domestic cooking, and improved apparatus and utensils to be employed therein.—F. Kemp. Coupling and disconnecting railway trucks.—J. T. Kirkwood and W. H. Smith. Treating metals by subjecting them to the action of gases charged with carbon, and apparatus employed therein.—J. T. Kirkwood and W. H. Smith. Treating metals by subjecting them to the action of gases or vapours, and apparatus employed therein.—J. Ruston. Apparatus for feeding thrashing machines.—C. C. Connor. Preparation of yarns and fibrous substances.—R. Long. Heating flat irons for laundry purposes, and apparatus employed therefor.—J. F. Allen. Strengthening cannons and other cylinders. (Complete specification.)—J. Hynam. Cigar-lights, matches, and other similar articles, and wicks for lamps, candles, and other like articles, and apparatus employed therein.—S. Haley. Machinery or apparatus for splitting hides or skins.—P. Egerton. Mounting spindles to be used for carrying revolving brushes, drills, and such like, to enable them to be applied by hand in any desired direction.—I. M. MacGeorge. Appliances for regulating the speed of steam and other like engines.—J. Toussaint. Moulds for casting metals and in coatings for such moulds.—J. Keats, A. Greenwood, and A. Keats. Machinery for manufacturing boots and shoes, part of which is also applicable to sewing machines generally.—J. Tapping. Machinery for cutting or forming clay and other plastic substances into bricks, blocks, or slabs.

On February 19th.—622 to 642.—O. Siebert. Gas-light apparatus.—T. Clegg and T. Lucas. Arrangements for effecting the grinding of the travelling flats of carding engines.—H. Cockney and F. C. Cockney. Furnace doors.—J. J. Aris. Horse-shoes.—C. E. Whitmore. Purifying middlings. (Complete specification.)—W. Neuhoff. Bathing tubs.—E. T. Hughes. Breech-loading fire-arms (com.)—S. Leoni. Heating and cooking apparatus.—J. B. Terrace. Mechanism for working steam-engine valves.—A. B. Clarke. Washing machine.—J. Peel and S. Emsley. Looms and pickers.—D. Dawson. Dyeing and apparatus connected therewith.—A. Piver. Distillation of essential oils or perfumes.—B. J. B. Mills. Wheel-barrows (com.)—S. Lowe and S. White. Signalling on railways, especially during fogs and dark weather.—G. Rydill. Steam generators or boilers, furnaces and flues, water tubes and water casing applicable as a steam generator for marine and land purposes, to utilize the heat, and for other purposes.—G. Kent. Machine for cutting or slicing fruit, vegetables, and other materials capable of being so treated (partly com.)—H. M. Mellor and L. Woodward. Rotary knitting machines.—W. H. Davies and F. H. W. Higgins. Electric telegraphs for giving signals and alarms.—H. Holland. Gas for illuminating and heating purposes.—T. B. Worrell. Bank locks (Complete specification.)

On February 20th.—643 to 656.—H. P Trueman. Apparatus for measuring liquids.—H. A. Bonneville. Axle or spindle sole or socket (com.)—J. A. Jones. Sliding sashes.—W. Bywater and S. Smith. Apparatus employed in drawing, spinning, or twisting wool or other fibrous substances.—H. A. Bonneville. Fenders and protectors for vessels (com.) (Complete specification).—J. Peak. Combined system of weights, measures, and coinage.—H. L. Bageau. Waterproof compound for sizing and coating leather, wood, cloths, or other articles.—E. A. Clegg and A. Hoyle. Looms for weaving.—C. W. Collins. Combinations of mechanism for working the slide valves of steam engines and other motors.—J. Stenhouse. Manufacture of sugar and purifying saccharine solutions.—H. Y. D. Scott. Treatment of sewage and manufacture of manure therefrom.—A. Nitzke. Cartridges.—J. Farmer. Machines for finishing printed sheets of paper.—J. Robinson and J. Smith. Machinery for shaping wood.

On February 21st.—657 to 668.—A. Dunlop. Endless or portable railways and wheels for facilitating the traction or draught of vehicles.—J. H. Johnson. Steam engines (com.)—W. L. Wise. Wheels for railway rolling stock (com.)—F. G. Brewer. "Ice breaker" ships, and screw propellers for the same, and for other ships (com.)—E. G. Brewer. Manufacture of artificial butter (com.)—D. K. West. Engines to be driven by water and steam, and pumps.—J. H. Johnson. Armour plates (com.)—D. Hipkins. Manufacture of artificial butter.—B. J. B. Mills. Felt hats (com.)—F. Armstrong. Clasping pin for securing articles of dress and for other like purposes.—P. A. Muntz. Apparatus for condensing and collecting the fumes evolved by furnaces used for melting metals, and for other metallurgical operations.—E. F. Jones. Railway, ship, and other lamps.

On February 23rd.—669 to 688.—T. Vicars, sen., and T. Vicars, jun. Steam generators and self-stoking furnaces therefor.—G. F. Elder. Crisping or doubling textile and other fabrics, and the machinery or apparatus employed therefor. J. Laird, jun., and W. Rutherford. Weaving bags, sacks, and other tubular and double fabrics, also single fabrics, and the means employed therefor.—H. Wilke. Steam boilers.—J. Baggs. Electric telegraphy and arrangement of apparatus employed therein.—J. Johnson. Ball casters.—J. Connell. Weaving ornamental fabrics.—R. S. Harvey. Privies and dry earth closets.—S. Newton and C. Newton. Puddling furnaces used in the manufacture of iron and steel.—H. B. Barlow. Brewing and machinery

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Scientific and Literary Review,

AND RECORD OF PROGRESS IN
ARTS, INDUSTRY, AND MANUFACTURES,
INCORPORATING THE
JOURNAL OF THE INVENTORS' INSTITUTE.

JUNE 1, 1874.

SCHOOL BOARD MEDDLESOMENESS.

"Save us from our friends" is an aphorism the truth of which receives fresh confirmation with our increasing experience of life, and certainly the present position of public elementary education in this country is another proof of the verity of this old saying, for the modern friends of education of the people are now so *thorough-paced* that they are determined everybody shall be educated according to the one routine they have settled as being the right one, and any other they will drive out of the land, if they can possibly manage it.

As may naturally be supposed, we feel the deepest interest in the cause of true education, and are anxious to do everything we can to aid in so expanding the machinery of popular instruction that hereafter every child, of whatever birth and parentage, shall be as well instructed in the elements of learning as the mental capacity of each child will allow, and further that those children who show decided aptitude for higher instruction shall be helped forward in their educational career; for we believe that the good of society and the prosperity of the country need the aid of the talents of every one, and that without a sufficient educational training talents will seldom, if ever, be satisfactorily applied.

But with all possible good wishes for the general spread of education, we cannot support the views of those who think it necessary for a certain quantity of book learning, and of one particular form, to be *nolens volens* crammed into the brain of every individual. Doubtless we ought to use all reasonable endeavours to secure for every child in the kingdom the possession of a passable acquaintance with reading, writing, and arithmetic, for these are, so to speak, the tools used in intellectual culture, but that this can only be done in a given number of years, in very early life, and on one plan only, we hold to be an utter absurdity; and we cannot allow that the education which shall be truly useful to the individual or the community at large should be restricted to book knowledge, for a person imperfectly acquainted with book lore whose observant faculties are quick and retentive is likely to be far more useful in the work-day world—aye, even the world of science—than one with better formal education and the dulled perceptions of the beautiful and the useful, which too often result from the continued compulsory use of the school form which many unfortunate children have to undergo; for, be it known to our educational enthusiasts, there are such beings as learned *fools*. Again, for most of us, a perfect knowledge of some art or trade is of far more importance than profound knowledge of grammar, history, or any of the "ologies."

In truth, the education which is to be worth having must take a wider range as to subjects, and be liable to less restriction as to the mode and time of inculcation than its professed friends in modern days seem willing to admit. Moreover, educational systems must not rely upon compulsion, but must stimulate by dealing out the "reward of merit" with a liberal hand.

For our part we consider it a very unfortunate matter that Government has been compelled to interefere with education at all, since everything, as we all know, which falls under its control is almost certain to be carried out in a procrustean manner, and this, when applied to education, is as fallacious a plan of action as can well be conceived, for the varying dispositions and tastes of individuals make it necessary that modes of education should be not uniform but various: unless, indeed, one dead level of mediocre intelligence is the thing to be attained, which we must confess ourselves opposed to. Our modern educationalists, however, think otherwise. Uniformity with them is everything, and they are, it seems, determined, if they can, to destroy the liberty we possess of adopting different methods in the teaching of youth, and in proof of their disposition to meddle with our freedom in this way reference to the reports of the religious squabbles of the School Board may be mentioned; but more direct evidence will be found in the cases reported in the daily journals in regard to the doings of the officers of the London School Board, which lead us to think that an educational dictatorship is intended to be established which shall crush out of existence all our private schools and home tuition.

We are too well aware that tyranny is an almost inseparable concomitant of power, especially when power is entrusted to officials of inferior grade (and to the truth of this the numerous complaints of abuse of authority by the police sufficiently testifies), to be surprised at any petty tyranny that may be exercised by Jacks-in-office under the plea that they are strictly fulfilling their duties, and we are not astonished at finding that the magistrates often treat complaints against inferior officers of law and government in a very cavalier fashion. But with all our knowledge of these things we are free to admit that we were not prepared to find that, in the first place, the School Board had appointed officers to arrest the children of decent citizens evidently on their way to or from school, and make them undergo an inquisitorial process; and then that the magistrates seem to think this the right thing to do. Surely, if the number of Government schools erected, or being erected, exceed the requirements of the hitherto wholly uneducated classes, they could be filled by making them superior to to the lower class private schools; and the Board need not set up for the supreme arbiter of education and allow none other than that which is given under its direction. As our readers may possibly consider these remarks too trenchant, we present them with the following statements of two cases reported in the public journals.

Not long ago Mrs. Mitchell, a lady keeping a middle-class school for the daughters of tradesmen, applied at Bow-street Police Court to Mr. Flowers, the sitting magistrate, stating that she had been a school-mistress for many years, and had been very successful with her pupils, who were taught French, German, and music at her school. She was, however, not directly under the control of the School Board, and in consequence of that the School Board officers had threatened the parents of her pupils with legal proceedings in the event of their daughters remaining at her school. Several of her pupils had already left in consequence of this, and she was afraid that several more would follow their example. More recently Miss Thompson, the keeper of a private school at Half Moon-crescent, Islington, attended before Mr. Cooke, magistrate at Clerkenwell, to complain of the conduct of Mr. Bates, one of the visitors of the London School Board, Finsbury division, under the following circumstances. She stated that Mr. Bates was in the habit of stopping persons and children who were on the way to her house, and openly telling them that her place was not a fit one to send children to. Mr. Cooke said the officer had *a perfect right to stop the children* and obtain their names and addresses. That was part of his duty. If the applicant had sustained any damage through what the officer had said she could bring an action in the County Court against him, and *if she sustained her case* the judge would award her ample damages.

That these are not mere Dogberry and Verges freaks, but part of a systematic onslaught by the School Board on independent private schools, will be evident from the report of the case in the *Daily Telegraph*, of 15th April last, of Mr. Webb, of Underwood-street, City-road, who was summoned to answer for not sending his little daughter to school, and he answered this complaint by stating that he did send his child to school; to which plea the School Board officer rejoined that this school was not an efficient one, and his *ipse dixit* Mr. Bushby, the sitting magistrate, seemed to think sufficient to settle the case. Other cases have been brought before the magistrates where the children have been under instruction at private schools or at home, but in all of them the same view of School Board authority has been adopted; so that it is evident, that parents, if not of such high position in life as to be unapproachable by School Board beadles, will have, in order to escape the unpleasantry of being "brought up at the police-court," to send their children to the School Board schools—where the question of religious teaching is in a state of unsettlement, and parental influence over mental culture is ousted. And this, which will be an illegal and unnatural usurpation of power over education we consider, will have a prejudicial effect in stunting youthful minds, and lead to the indefinite increase of local taxation.

Reviews.

MARINE BOILERS AND FURNACES.

"On the Principles of Combustion and Efficiency of Marine Boilers and Furnaces." By N. D. SPARTALI.

THIS pamphlet, after thoroughly discussing the philosophy of combustion, and showing that boilers on nearly all known constructions are (as every one knowing anything of the matter will readily admit) very imperfect, goes on to state that the writer has modified the present marine boiler by adding a second combustion chamber on the other side of the fire tubes, and by placing therein a small additional fire grate (at the front side of the boiler, just below the uptake), which, he says, to use his own words, I also raise to a good height over this combustion chamber leading to a small funnel—the heat and flame of this furnace will meet and catch the fumes and flames from the main furnace through the tubes, and set the smoke and gases into a continuous flame, and thereby cause an even distribution of heat throughout. I have also added to the model a plan for carrying over the flames ignited gases, from the second combustion chamber and furnace into a second upper series of tubes, into the other side of the boiler, right over the first combustion chamber, which is separated by a diaphragm, forming part of the boiler and containing water. By this concentration of heat into one body of water a greater evaporative power and steam of a greater pressure will be obtained and maintained at much less fuel than the present extravagant system of spreading the heating surface, increasing the number of boilers into as many as twelve, in some of the Atlantic steam ships professing to be working at the highest efficiency. Boilers, on this principle, will be able to work steam at 150 lbs. pressure per square inch, or equal to double the present nominal H.P. at same expense of coal. They are now getting a bare 70 lb. pressure. In fact, by careful calculation, I find they are burning as much coal to reproduce 90° of heat (from 212° to 302° that is lost through the condenser by the energy exerted by the engines) as if they were raising the temperature of the water from 50° to 212°; and I may be pardoned humbly to ask what can be the use of the surface condensers if they cannot maintain the bulk of the water in the boilers up to at least 212° constant?

I have also planned some oven boilers of moderate size, with double furnaces cased in iron frames, constructed of special metal and workmanship intended for higher pressures. These, as well as the modified present boiler as explained above, will be of such a size and construction, with due regard to bursting pressure and tensive strength, consistent with safety, to the available means for cleaning and repairing, and for the perfect and even circulation of the feed water. Boilers of too small a size for marine purposes are highly dangerous, owing to the scaling by the salt, and by the uneven expansion caused by the irregular circulation of feed water, and consequent overheating of the part of the tubes or plates, resulting often in explosion by action of the hydrogen gas contained in the boiler in contact with the oxide of the iron, causing chemical decomposition thereby, particularly where there is the least contact with air through any small oozing or leak.

In addition to the advantages herewith fully explained by the complete combustion and utilization of the fuel in boilers, I have found it to be a great advantage in using, with enclosed furnaces, a combination of silica and allumina composite matter as an auxiliary to coal fuel. This does not generate heat of itself, but being capable of absorbing an intense heat, and being of the same specific heat in fact as the coal itself, it will retain nearly half of it when the coal is gone into ash, and, by the addition of a very small quantity of fuel at a time a furnace may be kept up at a very high temperature, particularly when a blow of air pressure is used as an auxiliary. For domestic purposes I have used the same for now nearly one year with the best result in combination with coal in a semi-closed fire grate of my own invention, which can be made to the shape and size of any ordinary fire grate. The combustion affected in this little furnace sending 10° to 15° of heat into a room of nearly 4,000 cubic feet, is at a cost of less than 1 lb. of coal per hour, and as little as 12 lb. per 16 hours against 30 to 40 lb. according to the old system of firing.

My claims to the mode of combustion proposed, and by allowing as little escape through the chimney as possible, which I regulate by deflectors or dampers, are as follows:—Independently of the full value of 1 lb. of coal obtained, the advantage of heating the air in the furnaces, by the introduction of a moderate air blast, will be obvious by the increase of the volume of the gases in combination with the air, as explained by the tables, and by the rapid elevation of temperature in the furnaces—a most essential point in the successful working of high-pressure steam, and finally in the reduction of the number of furnaces, resulting from the increased volume of total heat as compared to the total mass of coal supplied.

PROCTOR'S UNIVERSE AND THE COMING TRANSITS.

"The Universe and the Coming Transits; presenting researches into, and views affecting, the Constitution of the Heavens; together with an Investigation into the coming Transits of Venus. Recently Confirmed by an Unanimous Vote of the Chief Astronomers of Great Britain." By RICHD. A. PROCTOR, B.A. (Camb.), Hon. Fellow Kings' College, London, formerly Secretary, R.A.S. London: Longmans, Green, and Co. 1874.

MR. PROCTOR'S reputation as an astronomer of the highest eminence is scarcely superior to his ability to afford information on astronomical subjects in manner to be "understanded of all men" who will give their minds to their consideration; and the volume before us is an apt illustration of the author's power of conveying the results of profound scientific research in an easy, perspicuous style.

The work contains two series of essays; one series relating to the Universe, the other to the approaching transits of Venus. And Mr. Proctor says:—

The essays on the Universe present, very nearly in chronological order, my researches into and gradually advancing views respecting the constitution of the Universe. With the exception of a few papers which have appeared in my "Essays on Astronomy," all my original researches into this subject are given in the present volume.

I believe that my account of the results obtained by Sir W. Herschel during his long and arduous labours in the study of the star-depths is more accurate than any yet presented.

In this volume I give full copies of all my maps and charts of the star-depths, except in the case of my large chart of 324,000 stars, sections from which only are given.

Plate VII. is by Mr. Sidney Waters, F.R.A.S., and is, in my judgment, a most valuable contribution to uranography.

The essays relating to the transits of Venus present the whole of my more strictly scientific discussion of that subject, as well as all the charts which I have drawn at different times to illustrate it. It has seemed to me desirable to publish these papers and charts in a collected form; because while American, German, French, and Russian astronomers have published very excellent and complete series of charts illustrating the transit of 1874, no British series has been published, nor has any student of astronomy in Great Britain, except myself, undertaken the thorough investigation of the conditions of the transit of 1874. In saying this I am not, on my own authority, undertaking to describe as insufficient the Astronomer Royal's investigation published in 1868. He himself, in a letter addressed to me in 1869, described that investigation as rough, and in fact merely preliminary. Nor in presenting my own results as accurate am I claiming for myself more than others have allowed. The Astronomer Royal, in a letter read before the Council of the Astronomical Society on January 10, 1873, when as yet little more than half the series now published was completed, spoke of my investigation as "probably the best yet made;" and as is now well known, every one of my suggestions has been adopted—except one, *made* in good time, but renewed unfortunately (so anxious was I to avoid undue haste) too late—I mean the suggestion that reconnaissances should be made in the Antartic and sub-Antartic Seas, to ascertain what places, if any, are suitable as additional southern stations for observing the transit of 1874.

It would be difficult, without presenting our readers with a complete *résumé* of the work to give anything like a worthy notion of it, and even then the numerous illustrations and maps which accompany the text would be required to be placed before the reader. Hence we refrain from further quotation, and refer all interested to the work itself.

GOODEVE ON MECHANICS.

"Principles of Mechanics." By T. M. GOODEVE, M.A., Barrister-at-Law. Lecturer on applied mechanics, at the Royal School of Mines. London: Longmans, Green, and Co. 1874.

THIS forms another of the valuable educational books, issued by Messrs. Longman.

The work contains an outline of one part of the course of lectures on applied mechanics, given by the writer at the School of Mines, and to those interested in the study of mechanics, we recommend the perusal of it.

NASMYTH AND CARPENTER ON THE MOON.

"The Moon: considered as a Planet, a World, and a Satellite." By JAMES NASMYTH, C.E., and JAMES CARPENTER, F.R.A.S., late of the Royal Observatory, Greenwich. With twenty-four illustrative plates of lunar objects, phenomena, and scenery. Numerous woodcuts, &c. London: John Murray, Albemarle-street. 1874.

THIS work may fairly rank amongst *chef d'œuvres* for we can truly say that it is long since any work on science has issued from the press which equals this one, not only as regards reliableness of information contained in its pages, but also in respect of the beauty and correctness of the illustrations, the mode by which the excellent series of illustrations were produced resulting in a delightfully correct picture:—Mr. Nasmyth, not content with the drawings he had accumulated for many years, and in order to present these illustrations with as near an approach as possible to the absolute integrity of the original objects, translated the drawings into models which, when placed in the sun's rays, would faithfully reproduce the lunar effects of light and shadow, and, by photographing the models so treated, faithful representations of the original were reproduced, and the result is in every way highly satisfactory. The text is quite on a level with the illustrations. Thus we have here a work that commends itself to all students and admirers of astronomy and science in general, and to such it will be of especial value, though it can be read with advantage and instruction by those who have no special aptitude for scientific research.

The first three chapters of the work deal with the cosmical origin of the planets of the solar system, the generation of cosmical heat, and the subsequent cooling of the igneous body. Then the consideration of the questions particularly connected with the moon may be said to be commenced in the fourth chapter, which deals with the form, magnitude, weight, and density of the lunar globe, this chapter being summed up by giving the facts on which the data is based, which we reproduce as we feel it might prove interesting :—

	That of Earth.
Diameter of the Moon 2,160 miles	$\frac{1}{3\cdot663}$
Area, 14,657,000 square miles	$\frac{1}{13\cdot424}$
Area of visible hemisphere, 7,328,500 square miles.	
	That of Earth.
Solid contents, 5,276 millions of cubic miles	$\frac{1}{49\cdot156}$
Mass, 73 trillions of tons	$\frac{1}{80}$
Density, 3·39 (water = 1)	0 62
Force of gravity at surface............	$\frac{1}{6}$
Mean distance from earth, 238,790 miles.	

In chapter V. is considered the existence or non existence of a lunar atmosphere, and on this question we doubt not that the authors will find many who disagree with them as to the possibility of non-existence of an atmosphere round the moon. The authors give various and very forcible reasons for their views as to the non-existence of a lunar atmosphere, and we cannot do better than quote from their book one of their reasons for arriving at that conclusion :—

The probable existence of an atmosphere used to be inferred from a phenomena seen during total eclipses of the sun. On these occasions the black body of the moon is invariably surrounded by a luminous halo, or glory, to which the name "corona" has been applied ; and, further, besides this corona, apparently floating in it and sometimes seemingly attached to the black edge of the moon, are seen masses of cloudlike matter of a bright red colour, which, from the form in which they were first seen and from their frame-like tinge, have become universally known as the "red flames." It used to be said that this corona could only be the consequence of a lunar atmosphere lit up as it were by the sun's rays shining through it, after the manner of a sunbeam lighting up the atmosphere of a dusty chamber ; and the red flames were held by those who first observed them to be clouds of denser matter floating in the said atmosphere, and refracting the red rays of solar light as our own clouds are seen to do at sunrise and sunset.

But the evidence obtained, both by simple telescopic observation and by the spectroscope from recent extensively observed eclipses of the sun, has set this question quite at rest, for it has been settled finally and indisputably that both the above appearances pertain to the sun, and have nothing whatever to do with the moon." This gives one out of many reasons for the views held by the authors, and the result, according to their views, "that all the evidence we have is summed up at the end of the chapter goes to prove that neither air nor water exist upon the moon," and that "in considering the causes that have given birth to the diversified features of the visible surface of the moon, we may therefore ignore the influence of air and water action, and confine our reasoning to igneous phenomena alone.

In chapter VI. the aspect of the lunar surface is considered, and this aspect under varied powers of telescopes ; and, in the next chapter, a very interesting topic is dwelt upon, viz., the typography of the moon, and this is very lucidly explained in various ways by which ultimately the mapping of the moon has been accomplished.

Our space does not permit of our treating on the subject of the next three chapters, which refer to the grandest aspect which the moon presents in the vastness of its craters, the volcanoes on our earth being of the utmost insignificance in comparison. The remainder of the work treats of the moon as a world and as a satellite, bu although we could present our readers with passages even more interesting than those already given, space compels to refrain from doing so.

THORPE'S QUALITATIVE ANALYSIS.

"Qualitative Chemical Analysis, and Laboratory Practice." By T. E. THORPE, Ph.D., F.R.S.E., Professor of Chemistry, Andersonian Institution, Glasgow; and M. M. PATTISON MUIR, F.R.S.E. London: Longmans, Green and Co. 1874.

WE have so repeatedly spoken of the excellence of the series of text-books now being issued by Messrs. Longman, of which the work under notice forms one, that all we can say of this work is that it fully sustains the high character of its predecessors for the sound matter and clear intelligibility with which important information is conveyed. More particularly as to the present work, we have to remark that it is written in such a style that the various operations of qualitative analysis are conveyed in a concise and clear form that adapts it to the wants of those who are not deeply versed in the science of chemistry, and without that clouding with formulæ which is generally found in works written presumably for the same class, which, as far as our experience goes, have proved more a bar than a help to the student.

This work is divided into two parts. In the first part, the student is instructed to perform a series of experiments in order to familiarize himself with the leading properties of non-metallic elements, and the principal substances which they form by their mutual union.

The experiments are generally of a very simple nature, and at the end of each lesson is a short statement or summary of the facts which the lesson is intended to convey. This last we think a very excellent course. The second part treats of qualitative analysis, being divided into five sections, each section treating of different modes of testing.

We think that the efforts of the authors have been accomplished, in their endeavour to make the book very practical, and within the scope of a student of ordinary intelligence. We cordially recommend it to every student and others interested in the study of chemistry.

ELEMENTARY SCIENCE MANUALS.

"Geology." By T. G. BONNEY, M.A., F.G.S., &c. Fellow-Tutor and Lecturer in Natural Science, St. John's College, Cambridge.

"Physiology." By T. LE GROS CLARK, F.R.S., Surgeon to St. Thomas's Hospital. London: Society for Promoting Christian Knowledge, 77, Great Queen-street, Lincolns Inn Fields.

IN the present day when the cry for technical education, and teaching of science in our elementary schools, seems to be echoing on every side, it is no wonder that books on the various sciences, both good, bad, and indifferent, are being showered down upon us with extraordinary rapidity, though we cannot say that we can commend what appears to us to be a perfect plethora, especially when we consider what proportion of them are of that character, that instead of doing any good do infinite harm to students. Being for the avowed purpose of facilitating passing at a particular examination, they are sought after, and, by reason of this much-to be-regretted system, things are crammed into a student's mind, so that instead of giving him a clear insight into the various elementary principles of the science he is anxious to have, he gets a mere smattering, which probably he would have done well to have left alone. Again, in consequence of the multiplication of these works it is difficult for teachers and students to settle which is the best work to use. However, if we allow that any necessity exists for the publication of the works under notice, we should say that no better books on elementary science could be written, the high reputation of their
authors as men of science being well susta
by the character of the contents of the wo

FLINT AND ALLIED BODIES.

"The Nature and Formation of Flint
Allied Bodies." A paper read befor
Geologists' Association, January
1874. By M. HAWKINS JOHNSON, F.
George P. Bacon, Lewes.

THIS pamphlet is in support of the auth
theory, which is as follows :—

Flint is an organic structure,—which
undergone at least two very remark
changes. The first is the substitutio
silicon, at some stage of its decomposit
for its carbon, resulting in the productio
silica, the binoxide of silicon, as an ulti
product, instead of carbonic acid, the
oxide of carbon. The silica thus for
being a stable, solid, crystalline substa
in lieu of a gas, like carbonic acid, the
of the original body is retained.

The second change, is the infiltratio
this siliceous structure with dissolved si
and the crystallization of this silica i
interior.

As these propositions, says the author
not likely to be received without opposit
I shall endeavour to anticipate, as well
can, the objections that are most likely
made.

This opposition is combatted in a way
worthy of the attention of geologists
chemists.

PEAT FUEL MACHINERY.

MR. JOSEPH McCARTHY MEADOWS rea
the last meeting of the Session 1873-7
the Institution of Civil Engineers the
lowing paper, which was directed to
consideration of points of difference in
struction and arrangement in some exam
of peat machinery which had been exam
by the author. The mechanical system
use were classified into the wet process
densifying, and the dry process for
pressing peat. The wet process mace
or mixed the raw peat, and for that pu
mechanism of the pug-mill class was us
employed. Of existing machines thos
Schlickeysen, Rahder, and Clayton
referred to. In the Schlickeysen, or
German Machine, the two-fold wor
mixing and of forcing out the peat
pulp under a moderate pressure was eff
by one operation of the arms or blad
the upright shaft of the mill ; while i
Rahder, or Dutch machine, the mixing
forcing were separate operations.
upper part of the Rahder pug-mill conta
the vertical shaft, the arms of which si
mixed the peat, while in the lower par
pulp was forced outwards, under a mod
pressure, by a short horizontal scre
spiral. The same two-fold action to
extent characterised the Clayton mac
with this difference, that the action o
screw or spiral was principally relied o
combination with fixed cutters in the i
of the casing, for a fine comminution o
peat. The author was, however, of opi
that a rough effective mixing of the
material was sufficient for making
dense peat, and that in practice mecha
for fine comminution was not desirable.
German and Dutch machines were stat
be capable of mixing and delivering, si
about 60 tons of wet peat for each full
ing day, which quantity, when in usua
dried state, would give from fourte
fifteen tons of dense peat fuel ; and pra
had shown that a single machine, upo
pug mill principle, could not be economi
or usefully taxed to give any much l
production. The machine of Clayton
not yet been tested by working resu
sufficient length spread over one or mor
seasons, and accurate data as to its av
capability of production were wan
The proportion of water in peat was
the average 80 per cent., and the treat
of 60 tons of raw peat in one machi

twelve hours, would represent its mixing and delivery in the state of pulp at the rate of about 230 cubic feet per hour. Working arrangements were either fixed or transportable; of the latter kind the Radher machine was instanced as a useful example. The author thought that the principle of transportability, by which the mechanism should constantly follow the excavation, was an essential requisite of commercial success where an extensive tract was to be worked. In the Radher system, the mills, with their portable engines (each from 6 to 8-horse power), travelled on rails laid temporarily alongside the line of excavation, and were thus kept close to the raw material which would otherwise, if the machinery were fixed, have to be moved with its 80 per cent. of useless water to the place of manufacture. The same principle of transportable mechanism was carried out in extensive peat works in Bohemia. Eichorn's system of making ball turf by the wet process was next described, specially with a view to illustrate the application of fixed lattice frames for drying the peat balls. For each Clayton machine nine thousand wooden trays were stated to be necessary for the drying; and the systems of Eichorn and of Clayton in this respect represented two distinct modes of arrangement.

Mechanism for disintegrating raw peat by rollers or cylinders armed with teeth or points was next referred to. In some instances the functions of machines of this kind were simply confined to producing pulp from peat without delivering it in shape. The mass of pulp was in such cases spread on the drying ground and divided into pieces by hand. Challeton's system, by which raw peat was reduced by copious addition of water into a thin fluid state, in which condition it flowed into shallow basins for filterage and partial drying, was next described, but the principle was not thought to be conducive to economic production. The extent of shallow reservoirs that would be requisite, and which, unless roofed over, would be available only for the few fine months of the year when peat could be made in the open air, did not constitute an improvement.

Exter's system for making compressed peat by the dry process was next detailed. The peat was obtained in a fine condition by a thin slicing of the surface of the bog, partly dried in the open air, and finally by artificial heat, and was then compressed by direct mechanical force, by iron rams or plungers, worked by steam power, from eccentrics.

In reference to the production of dense peat by the wet process, it was stated that on the Continent, in 1872, the cost varied from 6s. to 7s. per ton. With the present prices of labour in this country, the author thought the cost, when spread over a full year's expenses, could not be safely estimated at less than from 7s. to 8s. per ton. Economies might hereafter reduce the cost from 6s. 6d. to 7s. per ton, but not to less; and estimates based upon lower rates were, in the author's opinion, not reliable. As compared with an average of four varieties of German coal, the heating power of peat was stated to be about 60 per cent. that of coal. This result was arrived at in practice in Southern Germany, where peat was largely used for locomotive purposes, and in this respect, weight for weight, light fibrous peat gave as good a result as dense or compressed peat, the advantages of the latter consisting solely in the reduction of bulk and the concentration of the original quantity of peat in a smaller space. The economic worth of that reduction was, practically, the measure of the increased value given by mechanical systems to peat. The author thought that, in the vicinities of bogs, where the use of peat in its ordinary condition of cut turf had been established, changes were not likely to be made in the regular mode of preparation for local purposes; but if markets could be profitably opened for peat fuel at a distance, the reduction of its bulk would become of importance. As dense peat made by any system of the wet process gave, when charred, a firm charcoal, which was not obtainable in compact condition to the same extent from peat simply cut and dried, the author thought—looking to the great stores of coal in Great Britain—it was in that direction most hope lay for the advantageous application of mechanical processes. He supported this view by stating that in most cases abroad the adoption of mechanical systems might be traced to necessities which had arisen either from inferior character or local circumstances in connection with peat deposits there, which did not exist to the same extent in the deposits of peat of superior class which were found in these countries.

The paper closed with particulars of some laboratory tests, carefully conducted by Professor Galloway, of the Royal College of Science for Ireland, to ascertain the absolute heating power of peat. Three samples of dense peat made from the upper, the middle, and the lower portions of an Irish red bog, were used—each being in the best possible air-dried state. No. 1, from the upper fibrous portion of the bog, had a specific gravity of 0·637, weighed 39 81 lbs. to the solid cubic foot, and gave an absolute heating power, by Thempson's instrument, equal to 6·05 lbs. of water at 212° F., converted into steam by 1 lb. Sample No. 2, from the middle of the same bog, had a specific gravity of 1·000, weighed 62·50 lbs. to the solid cubic foot, and gave an absolute heating power equal to 5·50 lbs., of water at 212° F., converted into steam by 1 lb. Sample No. 3, made from the lower portion of the same bog, had a specific gravity of 1·173, weighed 73 31 lbs. to the solid cubic foot, and gave an absolute heating power equal to 6·33 lbs. of water at 212° F., converted into steam by 1 lb. Although differing in relative densities, the heating powers in respect of equal weights did not materially vary. When compared, however, in respect of their relative bulks, one cubic foot of No. 1 peat would be found to give an absolute heating power equal to the conversion of 240·87 lbs. of water at 212° F. into steam; while Nos. 2 and 3 would give respectively 343·75 lbs. and 464 07 lbs. of water converted in like manner into steam, from 212° F., for one cubic foot of each.

REPORT AND PROCEEDINGS AT THE INSTITUTE'S ANNUAL MEETING.

THE Annual General Meeting of the Inventors' Institute, for the year ending May, 1874, was held at 4, St. Martin's-place, Trafalgar-square, at four o'clock p m., on Thursday, the 14th May, 1874, when MARSHALL MASON HARRIS, Esq., Member of the Council, was unanimously voted to the chair. In opening the proceedings, he adverted to the fact that the Institute had now arrived at a period of its history when an opportunity seemed to present itself for its marching forward to achieve great things for the inventors' cause, and he trusted that the members would not forget this in dealing with the arrangements to be made for carrying on the business of the Institute for the future. They had in the Chairman of the Council, Sir Antonio Brady, one who, when absent, was as much interested in the prosperity of the Institute as when present. Captain Selwyn, also, they all knew as an able and earnest worker on behalf of the inventors' cause; and their own intelligence and activity, backed by such men and aided by such officers as the late lamented R. M. Latham, Esq., Mr. Campin (the present secretary), and the present auditor (Mr. Carttar), ought surely to secure for the Inventors' Institute a large measure of success; but he would just remark that self-congratulation would not effect this; there must be active interest evinced by the great body of the members, and last, though not least, the subscription list must be well kept up to the mark, for money was the "sinews of war." With these remarks he would call upon the Secretary to read the report of the Council, which would give them a general review of what the Institute had done during the past year, and afford them information of what it proposed to do in that upon which they were entering.

The SECRETARY then read the following:—

REPORT OF THE COUNCIL OF THE INVENTORS' INSTITUTE.

The Council of the Inventors' Institute, in presenting the twelfth annual report, have to congratulate their fellow-members on the fact that during the past year work of great importance has been accomplished, for not only have the subjects brought forward at the members' meetings been of a more than usually interesting and practical character, but the discussions have been well sustained, leading to full examination of the topics brought under notice thereat.

And, beyond this, the past year has been signalised as one in which Patent Law amendment has received considerable advancement.

Since the last annual report the Council has been in a position to present the members of the Institute with the decisions arrived at by the sub-committee for considering the propositions of the last committee of the House of Commons on the Patent Laws which, as reported in the Journal of the Inventors' Institute (SCIENTIFIC AND LITERARY REVIEW) for January and February, 1874, show a concurrence in the advisability of the various improvements in the organisation of the Government Patent Office proposed by the House of Commons Committee, and suggest that the cost of patents should be reduced to the extent of one half of the present fees and stamp duties at least, with the addition of very valuable observations as to the soundness of some of the views put forward by the House of Commons Committee on this question.

The advent of a new Parliament and new Government, it was considered, made the present time one that, under all the circumstances of the case, might be considered a crisis for the Patent Law question; hence it seemed very desirable that full and decided expression of the views of the whole body of members on the subject referred to should be obtained so that the Council might find itself prepared for immediate action of a satisfactory character, and it therefore determined to hold conferences with the members at large on the subject of the Patent Laws, and issued notices to all of them requesting their attention to this matter, and asking their consideration of the proposed Invention Right Bill, published in the Institute's Journal (the SCIENTIFIC REVIEW) for July, 1871, and the abstract thereof published in the same journal (the SCIENTIFIC AND LITERARY REVIEW) for September, 1872; also to the articles Nos. 1 and 2 on "Revision of Parliamentary Report on Patents," in January and February in the present year, and such notice stated that the special points for consideration were:—

1. A large reduction in the cost of letters patents, one-half having been suggested.
2. Amendment of the procedure for obtaining letters patent.
3. General reform of the Patent Office and Patent Museum arrangements.
4. Amendment of the legal procedure for repression of infringements, and of unwarrantable assumption of patent rights so as to render the same more certain and far less costly.

Each member was informed that it would greatly facilitate the object in view if only he would kindly communicate his views as to what importance he attached to these points, and what he considered to be the relative value of each point, that is, whether the first or any other is more pressing for amendment than the others.

These conferences were held on the 19th of March and 2nd of April last, at the first of which Sir Antonio Brady presided over a very full meeting, and at the second (that of 2nd of April), after reading communications in writing addressed to the Council by many members of the Institute, and fully discussing the question, especially in regard to the proposition that had been made for compulsory licences (on which much difference of opinion was evinced), it was proposed by Mr. Newton Wilson, a member of long standing, seconded by Mr. William Yates, C.E., and carried unanimously, that in order to give effect to those views of the members which had been expressed in favour of the amendment of the Patent Laws so as to afford inventors *cheaper* and *more protective Patents* "that the Council be recommended to apply to the Government at an early date soliciting that Legislative action be taken for the amendment of the Patent Laws."

Acting on this resolution the Council have taken the matter into consideration, and have directed the Secretary to ascertain the right Member of the Government to apply to, and he has reported that the Prime Minister, Chancellor of the Exchequer, and the Lord Chancellor should be applied to in the first instance.

Besides this direct action on the main question of Patent Law amendment, the Council have to report that at the International Patent Congress at Vienna the inventors' interests were very warmly advocated by the Honorary Commissioner of the Inventors' Institute, and the Congress being presided over by C. W. Siemens, Esq., F.R.S., D.C.L., &c., a member of the Council of this Institute, the attempts made to emasculate the patent system, if not to overthrow it altogether, were happily defeated.

The proceedings at the Vienna Congress will be found reported in the Institute's Journal (SCIENTIFIC AND LITERARY REVIEW) for September, 1873.

As it was found that the British Association for the advancement of Science would, at the Bradford meeting, in September last, take into consideration the Patent Law question, the Council determined that the Inventors' Institute should, if possible, be represented thereat; and Mr. F. H. Varley, the Chairman of the ordinary Council (or Executive), was solicited to attend that meeting, which, however, he was unfortunately prevented from doing. But though the loss of his advocacy was much to be regretted, the Institute found, in one of its members, who was also asked to represent the association at that meeting (and who, from being a local resident, was able readily to do so) that it had secured an able advocate who was a host in himself; that gentleman being S. C. Lister, Esq., of Manningham Hall, Bradford, and Leeds, a name well-known amongst inventors and manufacturers. What passed at Bradford in regard to the Patent Laws the members will find narrated in the number of the Journal (SCIENTIFIC AND LITERARY REVIEW) for November, 1873.

The Social Science Meeting at Norwich also promised a favourable opportunity for ventilating the question of Patent Law amendment; hence the Council determined to invite one of the members of the Institute, namely, I. Evans, Esq, engineer of the Gas Works, Norwich, to represent it thereat, and his ready compliance the Council gratefully acknowledge, though the discussion of the question was postponed.

The Chambers of Commerce have moved in the question of International Patent Right, and here again the Institute has had the good fortune of finding that part of its work well performed by some of its members, namely, Sampson Lloyd, Esq, M.P., member of the Council, Mr. Lister, already named, and Mr. Somerset Mackenzie, a gentleman well-known amongst shipowners.

Sir Antonio Brady, our chairman, Mr. Siemens, and other gentlemen connected with the Institute, have given their attention and assistance to a movement in favour of re-organising the Patent Museum, a very important matter for inventors and patentees, though one that in strict justice ought, as far as expenditure thereon is concerned, to be a matter for the ordinary revenue of the country to provide for. The Council would suggest that aid be given to Sir Antonio in his efforts in this direction, so that a satisfactory system as to the Patent Museum may be attained to without specially taxing the inventor.

With regard to the papers read at the Members' meetings, which have been before adverted to, the Council feel bound to signify their approval of those:—

"On Bogs and their Utilization for Peat Fuel and other purposes." By Peter Love, Esq.

"On the Economic Use of Gas for Heating and Cooking." By E. R. Southby, Esq., M.R.C.S. Inventor, Mr. —. Southby.

"On Prevention of Railway Accidents by Automatic Railway Couplings." By W. Gadd, Esq., C.E., Manchester. Inventor, Mr. Green.

"On Communication Apparatus for Railway Trains." By C. Fox Roe, Esq. Inventor, Mr. Stapleton.

"On Suppressing Fires by Novel Automatic Means of Indicating the presence thereof in Buildings." By P. A. Blake, Esq.

"On Raising Sunken Ships." By T. Vafea, Esq.

"On Construction of Iron War Ships and Fort Faces." By R. Bell, Esq., and

"On Improved Cooking and Heating Apparatus for Peat and other Fuel, with Suggestions for Food Reform." By Mrs. Amelia Lewis. A very interesting paper, which was fully illustrated by practical tests.

That the thanks of the Institute are due to the lady and gentlemen who read the above papers, the Council feel sure its members will readily agree. They have, it is true, already received votes of thanks at the meetings at which the papers were read; but the Council desire to propose a general vote of thanks from the Annual Meeting.

During the past year one of the oldest of the members of this Institute—we may fairly assume that he was the very oldest—has passed away from amongst us, and we need scarcely say that we allude to the death of Mr. Cornelius Varley, a man whose eminence in practical science was unquestionable, and whose geniality of character and moral worth were appreciated by all who had the happiness of his acquaintance. An account of his life is given in the Institute's Journal, of November, 1873. Death has also deprived us of Mr. J. I. Russell, well-known in regard to the improved manufacture of tubes; and Mr. De Bergue, also a well-known civil engineer and inventor.

Recently the attention of the Council has been called to the rules of the Institute which, being precisely the same as those adopted when the Institute was in its infancy, have in some particulars been considered susceptible of amendment. Taking this view of the matter, the Council some time ago appointed a Special Committee to consider and revise the rules and report thereon to the Council. This Committee has had several meetings; but, principally on account of Sir Antonio Brady, the Chairman of the Council, having had to proceed to America, has not yet reported on the subject. The Council, however, are prepared to suggest a course of action, and a new rule which they hope will be found to effect much of what is desired to be effected in regard to the rules.

The plan proposed is—that the Council do appoint an Executive Committee of 12 members, exclusive of the officers, and that this Committee shall be responsible for the management of the Institute; the Council retaining its power to dissolve this Committee and to deal with any matter as may be found requisite, should the necessity for such action on the part of the Council ever arise.

The new rule is:—1. That notwithstanding anything in the present rules contained as to the publication of minutes and giving of notices, it shall be deemed sufficient compliance therewith to publish such proceedings and notices as the Council or its Executive Committee may direct in the Journal of the Inventors' Institute, and all notices published in that Journal shall be deemed sufficient publication and notice, under the rules; unless when notices are specially ordered to be given by the Council or its Executive Committee. 2. That during the vacancy of the office of President of the Institute, the Chairman of the Council shall be deemed the President.

The Council also recommend the following practical arrangements to be made:—

The Chairman of the Council to be styled the President of the Council.

Two Vice-Presidents of the Council to be appointed, one, in absence of the President, to preside at Council meetings, the other at Executive Committees.

Also, for Treasurer, the Council recommend that M. M. Harris, Esq., be continued in that office, who kindly consents to act; and, as usual, Secretary and Auditors be elected.

The Council also recommends that Sir F. Cook, Sampson Lloyd, Esq., M.P., and Cromwell F. Varley, F.R.S., be elected as Vice-Presidents of the Institute.

Further, in order to facilitate the financial business, that the present Receiver of subscriptions be appointed Book-keeper by the Council.

The Secretary and Auditors to remain on the same footing as heretofore.

The audit of accounts of the Institute, which last year was very cursory, owing to the then recent death of the late lamented Secretary, R. M. Latham, Esq, in whom the Institute lost one of its founders, and an able and energetic promoter of its interests, has been very carefully conducted, and the Council are happy to say that, although the state of the finances show that they are susceptible of improvement, and, looking at the fact that some great movement ought now to be made on the Patent Law question, this is a matter every member ought to give serious attention to;—yet the finances are in a very fair condition, as the balance-sheet now presented to the members will show, though, as above mentioned, the need of funds is very great to enable the Council to carry on in an energetic and spirited manner the various important operations, which are comprised in the programme of the Institute, and they hope that after this appeal no member will allow his subscription to remain in arrear.

The report of the Council having been read, and the balance sheet submitted to the meeting, on the motion of the CHAIRMAN, seconded by Mr. HILLIER, the report was received and adopted.

The Council was then elected, the list being the same as that stated in the advertisement of the Institute on another page.

Mr. YATES then moved, and Mr. VARLEY seconded, the re-appointment of Mr. F. W. Campin as Secretary of the Institute, which was carried unanimously.

The re-appointment of Mr. C. G. Carttar, as Auditor, was then moved by Mr. A. J. MURRAY, and seconded by Mr. MORGAN, and carried unanimously. It was then proposed by Mr. CAMPIN, and seconded by Mr. MURRAY, and carried unanimously, that Mr. MARSHALL MASON HARRIS, Member of the Council, be Treasurer for the year ensuing.

The following votes of thanks were then carried unanimously:—

To Sir A. Brady, Chairman, Captain J. Selwyn, R.N., Vice-President, the other vice-presidents, and the rest of the Council of the past year, proposed by Mr. H. Hand, and seconded by Mr. Hillier

To the officers, proposed by Mr. Hillier, and seconded by Captain J. Selwyn, R.N.

Captain Selwyn responded for the Council (Sir A. Brady being absent in America), and Mr. Campin, the Secretary, for the officers.

To the readers of papers during the session, moved by Mr. Varley, seconded by Mr. Murray.

The proceedings terminated by a vote of thanks to the Chairman of the meeting, proposed by Captain Selwyn, and seconded by W. Yates, Esq., C.E.

INTERESTING ANCIENT RELIC.

At the meeting of the Royal Society of Literature, held on the 22nd April last (C. Clark, Esq., in the chair), an interesting paper was read "On the Silver Patera procured many Years Ago by Dr. Lord in Badakhshan," contributed by Dr. G. Birdwood. In this paper, Dr. Birdwood pointed out the singular interest attaching to this relic, of probably the fourth century A.D., and showed that it was, in character, late Roman work, of which, especially in size and preservation, few similar have come down to our time. The subject is the Triumph of Dionysus, who is represented reclining on a car, with the wine-bowl in his right hand, and drawn by two female figures. Behind him is a dancing Hercules, above two Eotes, and below a panther, pressing his head into the wine amphora. The material is of silver, and in some parts the patera has been heavily gilded. Dr. Birdwood thinks that the general debasement of the style of execution, and the feebleness and slovenliness of the treatment, clearly indicate that it belongs to an age when art was already severely suffering from the superabundance of wealth and luxury—when it had fallen from the service of the gods, and had been prostituted to the ostentation of vulgar and upstart speculators. He further suggested that it might have been carried into Central Asia as a prize, either after the death of Julian, in A.D. 363, or at the sack of Antioch by the Persians, in A.D. 540.

DIVISION OF ALGEBRAIC QUANTITIES BY THE METHOD OF DETACHED CO-EFFICIENTS.

By Edward David Hearn, M.A.,
Columbia College, New York.

The great economy of time and space, and the vast diminution of the chances of error secured by the use of Horner's method of detached co-efficients, whenever applicable, for performing the operation of division of algebraic quantities, has caused the method to be at all times regarded with great favour by practical men, although with the rule commonly given its application has been comparatively limited.

The student is usually taught that the method of detached co-efficients is not applicable to division unless the co-efficient of the leading term of the divisor be unity; but this is not really the case, although when the co-efficient of the leading term is not unity, the process must be somewhat modified. The reason is obvious; but as the modified process has never, so far as I know, been explained, I take the present opportunity of submitting it.

To economise space, I shall assume that the reader is acquainted with the processes of multiplication by the method of detached co-efficients, and with that of division by the same method when the co-efficient of the leading term is unity.

Now, we know that the figures which we obtain by multiplying the terms of the divisor (other than the first), by the several terms of the quotient as found give us, by the method in question, the true quotient; but only because the first line of the partial product, resulting from the multiplication of the quotient by the divisor, is identical with the quotient. But if the co-efficient of the leading term of the divisor be not unity, the first line of the partial product will be a multiple of the quotient, and mere addition or combination cannot assist us to discover what multiple of the true quotient it really is. But we can, by the use of simple arithmetical division, very readily correct the false quotient, term by term, and thus obtain the true co-efficient to work with for the purpose of discovering the next term. Suppose, for example, we desire to perform the division indicated by the formula—

$$\frac{21a^8+14a^7-49a^6-8a^5-10a^4+41a^3-a^2-14a+2}{3a^3+2a^2-7a+1}$$

We shall have no difficulty in doing so by the method of detached co-efficients, provided we be careful to correct by division the co-efficients of the quotient term by term as we come to them. The working of this example will be readily understood, and it will be seen that the economy of time is even greater than when the co-efficient of the leading term of the divisor is unity.

$$\begin{array}{r|l}
3 & 21+14-49-\ 8-10+41-1-14+2\\
-2 & \quad -14+\ 0+\ 0+10+\ 0-4\\
+7 & \qquad\quad +49-\ 0-\ 0-35-0+14\\
-1 & \qquad\qquad\quad -\ 7+\ 0+\ 0+5+\ 0-2\\
\cline{2-2}
 & \quad -0-\ 0-15-\ 0+\ 6.\\
\cline{2-2}
 & 7-\ 0-\ 0-\ 5-\ 0+\ 2,\quad 0\quad 0\quad 0
\end{array}$$

Here we have an example, which would otherwise have been somewhat tedious, manipulated with the same facility as though the co-efficient of the leading term of the divisor were unity. We commence by dividing the first term of the dividend by the first term of the divisor, and place the quotient in the true quotient line. The products of this figure, when multiplied by —2 + 7 and —1 respectively, give us our first diagonal, and we place —14 + 49 and —7 in the second, third, and fourth columns. The sums of the second and third columns being zero, we have all ciphers for our second and third diagonals. The sum of the fourth column is —15, which we place in the 'false quotient line," and, dividing it by 3 (the co-efficient of the leading term of the divisor), we obtain —5 as the fourth term in the true quotient line. The products of this figure, when multiplied by —2 + 7 and —1, give us + 10 —35 and + 5 for our fourth diagonal. The sum of the fifth column being zero, our fifth diagonal consists of ciphers. The sum of the sixth column is + 6, which is placed in the false quotient line and divided by 3, which gives us + 2 for the true quotient line. Using this + 2 as multiplier, we obtain —4 + 14 and —2 for our sixth diagonal, and the sums of the seventh, eighth, and ninth columns being zero, shows us that there is no remainder.

It must be remembered that, in the remainder columns, the false quotient line is not used, and that the figures representing the co-efficients of the terms of the remainder are never used to produce diagonals—the same is the case when the co-efficient of the leading term of the divisor is unity.

Let us now value our quotient. We know that dividing $21a^8$, the first term of the dividend, by $3a^3$, the first term of the divisor, gives us $7a^5$ for the first term of the quotient; therefore, the complete quotient will be $7a^5-0a^4-0a^3-5a^2-0a+2$; or omitting the insignificant terms, $7a^5-5a^2+2$, which is the true quotient.

In order to show that the remainder comes out correctly as well as the quotient, we will perform, by the same method, the division indicated by the formula—

$$\frac{2a^5+7a^4+20a^3+30a^2+41a+30}{2a^3+3a^2+4a+7}$$

As the co-efficient of the leading term of the divisor is not unity, we again use our "false quotient line;" and the working will stand thus:—

$$\begin{array}{r|l}
2 & 2+7+20+30+41+30\\
-3 & \quad -3-\ 6-15\\
-4 & \qquad\ -\ 4-\ 8-20\\
-7 & \qquad\qquad -\ 7-14-35\\
\cline{2-2}
 & \ +4+10,\\
\cline{2-2}
 & 1+2+\ 5,-0+\ 7-\ 5
\end{array}$$

It will be unnecessary to give the details of the working, as it is similar to that already explained. By valuing the result obtained, as before, we have,

Quotient .... a^2+2a+5
Remainder ...... $7a-5$

It may be mentioned that when there are more quotient columns than remainder columns, the remainder is ranged from the right hand, as shown above. With further modification many more complicated divisions may be performed by the method of detached co-efficients; but these need not here be referred to.

Correspondence.

STOTT'S SYSTEM OF SEWER VENTILATION.

To the Editor of the Scientific and Literary Review.

Sir,—I beg respectfully to thank you for inserting in your paper of May 1st the favourable report on my system of ventilating sewers and drains of their noxious gases contained in your notice of the Manchester Exhibition, and, at the same time, beg to correct an error in the name. You have it in your paper Clott's, which is wrong; it should be "Stott's" System. I may say that the system has been in operation at Halifax and several other places two years; it has proved so successful in Halifax that the corporation have bought for that town the right to fix as many as they require.—I am, &c.,

Henry Stott.

[We shall be glad to receive a more definite description of Mr. Stott's invention. —Ed. S. & L. R.]

AIR CUSHIONS.

To the Editor of the Scientific and Literary Review.

Sir,—Might it not be practicable to apply the principle of the air cushion to canoes made of skins for travellers, so that the canoe could be inflated to cross a river or swollen stream? and could it possibly be made useful in the car of a balloon?

H.

Poison in Sweets.—Dr. Cameron, of Dublin, in his account of an analysis of sweets, gave the following description of a "baby in its cradle," apparently a delicious sweetmeat:—The cradle was made of plaister of Paris and sugar, and the body of the baby was of sugar and starch. Its eyes were Prussian blue, its cheeks stained with cochineal, and its clothes were painted with chromate of lead.

London Gregorian Choral Association.—Under this association, the President of which is the Right Hon. the Earl of Beauchamp, a festival service was holden at St. Paul's Cathedral on Thursday, 7th May. The choir consisted of 1,000 voices, accompanied with two trumpets, two euphoniums, and four trombones. The organists were Dr. Stainer and Warwick Jordan, Bac. Mus. Oxon. The music generally was superior to the former festival. Of the Psalms we think "Beatus vir qui timet" was the best performed. The introduction to the anthem was very telling. It seemed composed for the occasion; indeed, we cannot praise too highly the organ performance throughout. We wish good musical festivals were more frequent. Judging from the crowded congregation, they are much appreciated and becoming very popular.

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THE INVENTORS' INSTITUTE,

4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE, LONDON
ESTABLISHED 1ST MAY, 1862.

Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

Chairman of the Council:

SIR ANTONIO BRADY.

NOTICES.—SESSION 1873-4.

Attendance of Members and their Friends is requested on—

THURSDAY, June 11th.—"On Anti-Wave Ships." By Dr CARMICHAEL.

THURSDAY, June 18th.—Council Meeting at half-past 7 p.m.

TO MEMBERS OF COUNCIL.

Council Meetings at 7 p.m. on 11th June.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

At the meeting of the Council (ordinary and special) held on 30th April, 1874, Mr. M. M. Harris presiding, the last minutes having been passed, it was agreed, in consequence of the members' meeting, to be held that evening, being of a special character, and Dr. Hardwicke who was to preside thereat having to be welcomed by the Council, to adjourn all other business till Thursday, 7th May.

At the adjourned meeting, on 7th May, M. M. Harris, Esq., presiding, the Secretary presented a sketch of the proposed report of the Council to the Annual General Meeting. This having been considered, and various suggestions made thereon, it was left to the Secretary to complete the draft and bring it up at the next meeting of the Council, on 14th inst.

It was resolved unanimously that in said Annual Report the appointment of an Executive Committee of the Council of 12 members be recommended, and that notices given in the Journal of the Inventors' Institute (SCIENTIFIC AND LITERARY REVIEW) be sufficient notices, unless the Council or Executive Committee (when appointed) direct notices to be specially sent to each member.

The Secretary and Auditor announced that they intended to become life members; also Fredk. Harper, Esq.

Mr. M. M. Harris, being willing to accept the treasurership, was nominated thereto. And it was recommended that the Receiver should be authorized to make the periodical payments to the Journal of the Institute, and present vouchers thereof to the Treasurer; and also, when ordered, the Secretary's salary. Balances to be paid to a deposit account at banker's.

It was proposed to have a public dinner, but this it was ultimately determined to defer till the opening of the next session.

At the meeting of the Council (ordinary and special) held on 14th May, M. M. Harris, Esq., in the chair, the minutes of the last meeting were passed, and the draft of the report, as completed by the Secretary, agreed to, and ordered to be presented to the Annual Meeting. (This report is given in another column.)

At the meeting on 30th April a very pleasant *réunion* of members took place, many ladies being present. Light refreshments were served in the Council Room. Mrs. Lewis's address and the discussion thereon are given in another column.

The Annual General Meeting is reported at another page.

Monthly Notices.

The Resignation of Professor Sharpey, of the Chair of Anatomy and Physiology at University College, which he has held for nearly forty years, is announced.

The Death of Mr. George Warrington, Scholar and B.A. of Caius College, Cambridge, at Pieter Maritzburgh, at the age of thirty-three, is announced. He succeeded his father as Chemist to the Apothecaries' Company.

Mr. Leonard Lyell, the nephew of Sir C. Lyell, Bart., has been appointed Professor of Natural Science in the University College of Wales.

Mr. Tower, C.E., known to the public as the inventor of "Tower's Speed Indicator," and as the assistant of Sir W. Thomson in his deep-sea soundings off Gibraltar, also as associated with Mr. W. Froude in his experiments on the rolling of vessels, which led to important results in our dockyards, has recently accepted the post of Constructor of Torpedoes in Sir W. Armstrong's works at Elswick.

An International Monument to Captain Maury, which shall take the form of a lighthouse, is proposed.

Lady Graduates.—A memorial has been presented to the Premier, signed by twenty-six of the Professors of the four Scotch Universities, praying that he would take into immediate consideration the difficulties at present in the way of ladies desiring to matriculate in Medicine at the Scotch Universities; and that Universities should by enactment be, if not *required*, at least *enabled* to make arrangements for the education of women. The Convocatoin of the University of London (the general body of members) have voted in favour of the admission of women as members; the matter, however, has yet to come before the Senate.

The Russian Scientific Expedition to Amu Daria is finally organised under the command of the Grand Duke Nicholas Constantinovitch, assisted by Col. Stoletoff and Dr. Moreff as secretary. Explorations will also be made beyond the confines of the Russian territory in the Khanate of Bokhara, up the course of the Amu Daria—if political matters in Central Asia will permit. The commander and most of the members of the expedition were to have left St. Petersburg on Sunday, the 26th of April.

Colouring Matter from Sawdust.—Messrs. Croissant and Bretonnière, says the *Athenæum*, have patented a process for obtaining valuable colouring matters from saw-dust, bran, and various waste substances. When such materials are heated with caustic soda and flowers of sulphur, a sulphide of sodium is produced, and this, re-acting on the organic matter, effects its dehydrogenation, with evolution of sulphuretted hydrogen. The result is said to be a valuable dye-stuff, having strong affinity for organic fibres. By varying the proportions of the materials used, a variety of tints may be obtained from one and the same substance.

Crystallized Glass, obtained from bottle-glass works at Blanzy, in France, has been the subject of investigation by Mr. Peligot. These specimens differ from ordinary devitrified glass in being well crystallized in prismatic forms resembling augite. The analysis of this glass tends to support the views of some chemists that devitrified glass is not simply distinguished from vitrified glass in arrangement of molecules, but differs in chemical composition from vitreous; the crystallised parts containing more magnesia and less soda than the clear glass from which the crystals had separated.

Crystal Palace Flower Show.—The annual grand flower show of the season took place on Saturday, 9th ult., which upon the whole was superior to former years. The flowers were very beautifully arranged on each side, from end to end, while the bright colours harmonised admirably with the many gaily-dressed ladies who thronged the promenade. The display of roses, azaleas, calceolaias, and ericas met with universal praise. The profusion of bloom which some of these exhibited surpass the rival shows of the Horticultural Gardens. The pansies, placed on elegant stands, were greatly admired; the light and shade in these flowers were the perfection of beauty. We noticed that some few of the petals and corolla of the ericas were not perfect, but this probably arose in transit. Our space will not permit us to notice the prizes, of which there were many. Great praise is due to the secretary for the admirable manner in which these shows are arranged.

Proceedings of Societies.

ROYAL SOCIETY.

APRIL 16TH.—The President in the chair.—The following papers were read:—"On the Pneumatic Action which accompanies the Articulation of Sounds by the Human Voice, as exhibited by a Recording Instrument," by Mr. W. H. Barlow; "Note on the Periodicity of Rainfall," by Mr. J. H. N. Hennessey; and "Studies on Biogenesis," by Dr. W. Roberts.

April 23rd.—The President in the chair.—The following papers were read:—"On some Points connected with the Circulation of the Blood, arrived at from a Study of the Sphygmograph Trace," by Mr. A. H. Garrod; "Note on the Minute Anatomy of the Alimentary Canal," by Mr. H. Watney; and "On the Refraction of Sound by the Atmosphere," by Prof. O. Reynolds.

April 30th.—Professor A. C. Ramsay, V.P., in the chair. The following papers were read:—"The Structure of the Mucous Membrane of the Uterus and its Periodical Changes," by Dr. J. Williams; "On Leaf-Arrangement," by Dr. H. Airy; and "On the Improvement of the Spectroscope," by Mr. T. Grubb.

ROYAL INSTITUTION.

MAY 1ST.—Annual Meeting.—Warren De La Rue, Esq., V.P., in the chair. The Annual Report of the Committee of Visitors for the year 1873 was read and adopted. This Report testifies to the increasing prosperity and efficiency of the Institution, and congratulates the Members on the fact that the new laboratories have been constructed and fitted up by means of funds contributed by themselves; and that this heavy charge in not larger than what the surlpus income of a few years will probably be able to reimburse. Fifty new members were elected in 1873. Sixty-two lectures and nineteen evening discourses were delivered. The books and pamphlets presented amounted to about 120 volumes, making, with those purchased by the Managers, a total of 259 volumes added to the library in the year, exclusive of periodicals. Thanks were voted to the President, Treasurer, and Secretary, to the Committees of Managers and Visitors and to the Professors, for their services to the Institution during the past year. The following gentlemen were elected as officers for the ensuing year:—President, the Duke of Northumberland; Treasurer, G. Busk; Secretary, W. Spottiswoode; Managers, G. Berkley, Admiral Sir H. J. Codrington, Warren De La Rue, Sir T. F. Elliott, E. Frankland, F. Galton, J. P. Gassiot, C. H. Hawkins, A. Latham, J. C. Moore, Sir W. F. Pollock, the Earl of Rosse, R. P. Roupell, C. W. Siemens, and Colonel P. J. Yorke; Visitors, J. Brown, J. C. Burgoyne, A. J. Ellis, Colonel J. A. Grant, Lieut.-Gen. Sir F. W. Hamilton, T. H. Hills, R. P. Linton, W. Millar, A. C. B. Neill, W. S. Portal, W. Salmon, J. B. Sedgwick, J. Spedding, the Hon. J. G. P. Vereker, and H. Wedgwood.

May 4th.—The Duke of Northumberland, President, in the chair. Miss C. C. Astley, Messrs. G. L. Bassett, W. M. Brown, J. O. Corrie, H. Deacon, G. K. Hardie, G. J. S. Lock, T. F. Miller, S. Sampson, and T. Taylor were elected Members. J. Tyndall, Esq., was re-elected Professor of Natural Philosophy. The Managers announced that they had appointed J. H. Gladstone, Esq., Fullerian Professor of Chemistry.

ROYAL SOCIETY OF LITERATURE.

APRIL 29TH.—The following were the Council and Officers elected for the ensuing year:—President, The Lord Bishop of St. David's; Vice-Presidents, The Lord Archbishop of Canterbury, the Duke of Devonshire, the Dean of Westminster, Right Hon. Sir W. Erle, Sir H. C. Rawlinson, H. Fox Talbot, Esq., Sir P. de Colquhoun, Sir C. Nicholson, Bart., Major-Gen. Sir C. Dickson, and the Rev. C. Babington; Council, Messrs. W. de Gray Birch, J. W. Bone, E. W. Brabrook, C. H. E. Carmichael, C. Clark (Treasurer), C. Goolden, S. G. Grady, N. E. S. A. Hamilton (Hon. Librarian), C. Harrison, J. Haynes, R. B. Holt, C. M. Ingleby (Foreign Secretary), G. W. Moon, C. R. des Ruffières, W. S. W. Vaux (Secretary), and H. W. Willoughby; Auditors, Rev. T. Hugo and H. Jeula; Clerk, Mr. Ayres; Collector, Mr. G. A. Stretton.

THE INSTITUTION OF CIVIL ENGINEERS.

AT the meeting of this society on Tuesday, May 5, 1874, Mr. Harrison, president in the chair, twenty-three gentlemen were balloted for and declared to be duly elected, of whom five were members, viz.: Messrs. Percy Burrell, joint consulting engineer to the Government of Paraguay; Thomas Curtis Clarke, Philadelphia, U.S.A.; Charles William Hawkins, locomotive superintendent of the Great Indian Peninsula Railway; William King, engineer to the Liverpool United Gas Light Company; and Henry Valpot Francis Valpy, joint consulting engineer to the Government of Paraguay. Eighteen gentlemen were elected associates, viz.: Messrs. Thomas Hope Green Berrey, superintendent and manager of the Manchester Water Supply; George Woulfe Brenan, Bishopsgate-street; John Richard Brittle, Westminster; William Frederic Butler, Westminster; Frank Cheesman, Stud. Inst. C.E., chief engineer to the Japan Paper Making Company; Henry Deane, B.A., sub-manager of the ship-yard of the Danube Steam Navigation Company; Charles Preston Gibbons, Stud. Inst. C.E., contractors' staff, West Surrey Waterworks; Edward Worrell Jarvis, resident engineer, Canadian Pacific Railway; Thomas William Jeffcock, Sheffield; William Millbanke Mayes, Bilbao, Spain; John Charles Melliss, Kenilworth; Edward Perrett, Westminster; Joaquim Galdino Pimentel, Rio de Janeiro; Robert Sharland, Stud. Inst. C.E., resident engineer of the Aba-el-Wakf Sugar Factory, Egypt; Walter Halsted Cortis Stanford, Westminster; Edward Herbert Stone, Stud. Inst. C.E., assistant to superintending engineer, Nizam's State Railway; Archibald Sutter, Edinburgh; and Henry Michell Whitley, Westminster.

It was announced that the Council, acting under the provisions of the bye laws, had transferred Messrs. Wilfrid Airy, B.A., Henry John Card Anderson, Marcus Smith, and Wilberforce Wilson, from the class of associate to that of member; and had admitted the following candidates as students of the institution—viz., Messrs. Lawford Maclean Acland, Percy Leonard Addison, Robert Philip Atkinson, Charles John Seymour Baker, Edward Baker, Alfred William Thomas Bean, Alexander Bewley, Hugh Robert Blackburn, Percy Wilson Britton, William Henry Cole, George Owen William Dunn, Charles Henry Holme, Edward Henry Johns, Lawrence Moore Kortwright, Francklyn Lang, William Cuthbert Lewis, Edward Leycester, Charles Perrin, and the Hon. Lockhart Matthew St. Clair.

ZOOLOGICAL SOCIETY.

APRIL 21ST.—The Viscount Walden, President in the chair. The Secretary read a report on the additions that had been made to the Society's Menagerie during 1874. Among these particular attention was called to a scarce parrot (*Chrysotis Finschi*), of which a specimen had been presented by Mrs. Chivers. Letters and communications were read:—From Mr. M. Allport, on the capture of a grilse in the River Derwent, in Tasmania; from Dr. J. E. Gray, "On the very Young of the Jaguar, *Felis* (*leopardus*) *onca*," "On the Short-Tailed Armadillo, *Muletia septemcincta*," "On the Young of Bosch Vark, *Patomochœrus Afrincanus*, from Madagascar," and "On the Skulls of the Leopard in the British Museum;" from Dr. O. Finsch, on a new species of penguin, from New Zealand, which he proposed to call *Eudyptala albosignata*; from Capt. W. H. Unwin, on the breeding of the Golden Eagle (*Aquila chrysaetos*) in North-Western India; by Mr. J. E. Harting, on a new species of Tringa, from St. Paul's Island, Alaska, which he proposed to name *Tringa gracilis*; from Lieut. R. W. Ramsay, on an apparently new species of woodpecker, which he had obtained in a teak-forest, about six miles to the north of Tanghoo, in British Burmah, which he proposed to name *Gecinus erythropygius*; by Messrs. W. T. Blanford and H. E. Dresser, on the genus Saxicola, Beechstein, being an attempt to reduce into some order the excessively confused nomenclature of the species composing this genus. Mr. E. Ward exhibited the skull and horns of a fine specimen of the Persian stag (*Cervus maral*), from the Crimea.

May 5th, 1873.—Dr. E. Hamilton, Vice-President, in the chair.—The Secretary read a report on the additions that had been made to the society's menagerie during the month of April, 1874, amongst which were a Vigne's sheep (*Ovis vignii*), presented by Captain Archibald; a white-cheeked flying squirrel (***Pteromys leucogenys***), presented by Mr. A. Gower; a new kangaroo (*Halmaturus luctuosus*), deposited by Sig. L. M. d'Albertis, and four bladder-nosed seals, presented by Captain D. Gray and Captain Alexander Gray. Mr. Sclater made some remarks on the cassowary, living in the society's gardens, hitherto called Kaup's cassowary, which, it appeared, ought to bear the name *Cassuarius papuensis*. Mr. Sclater announced that H. M. Government had consented to send a naturalist to Kerguelen's Land to accompany the Astronomical Expedition shortly proceeding there, and that the Rev. A. E. Eaton had been selected by the Royal Society for the post. Mr. Blanford exhibited and made remarks on a series of the ibex of Persia, which he considered to be referable to *Capra ægagrus*. Mr. A. H. Garrod, F.Z.S., read a paper on the anatomy of the columbæ, in which a new arrangement of that group of birds was proposed, based upon certain points not hitherto sufficiently investigated. A communication was read from Dr. Julius Haast, containing the description of a new species of *Euphysetes* (*Euphysetes pottsi*), a remarkably small catodont whale, which had occurred on the coast of New Zealand. A communication was read from Mr. Frederick Moore, containing a list of Diurnal Lepidoptera collected in Cashmere by Captain R. B. Reed, 12th Regiment, with descriptions of new species. A communication was read from Mr. A. G. Butler, containing a complete list of the known Diurnal Lepidoptera of the South Sea Islands. Mr. Howard Saunders read a paper on the grey-capped gulls, in which several species hitherto confounded were distinguished. A paper was read by Dr. A. Günther, F.R.S., entitled, "A Contribution to the Fauna of Savage Island," in which several new lizards peculiar to this remote Pacific Island were described, and other animals found in it were mentioned. A communication was read from Dr. J. S. Bowerbank, F.R.S., containing the sixth part of his "Contributions to a General History of the Spongiadæ." Mr. R. B. Sharpe read a paper on a small collection of birds made in Bulama, one of the Bissagos Islands, West Africa, by Lieut. Bulger.

CHEMICAL SOCIETY.

APRIL 16TH.—Prof. Odling in the chair.—Dr. A. W. Tilden read a paper "On Aqua Regia and the Nitrosyl Chlorides." He finds that when the gases evolved on gently heating aqua regia are passed into concentrated sulphuric acid, a product is obtained which, at a low temperature, deposits crystals of nitrosyl sulphate, $NOHSO_4$. Both these crystals and the liquid, when mixed with sodium chloride, and gently heated, evolve nitrosyl chloride, NOCE, an orange yellow gas, which may be condensed to a deep orange red liquid, boiling at 8° Cent. The author could not obtain the dichloride $NOCE_2$ which Gay-Lussac supposed to exist, but which he believes to be merely a solution of chlorine in the monochloride. Dr. C. R. A. Wright read a paper "On Isomeric Terpenes and their Derivatives, Part IV., Section 1, On Cajeput Oil," by C. R. A. Wright and Mr. T. Lambert. It was found that the cajeputol $C_{10} H_{18} O_1$ boiling at 176° —179° Cent., obtained from oil of cajeput, combines with bromine, forming the compound $C_{10} H_{18} Br_2 O$. On heating this, it splits up into cymene, $C_{10} H_{14}$, hydrobromic acid and water. Section 2, "Action of Pentasulphide of Phosphorus on Terpenes and their Derivatives," by Dr. C. R. A. Wright. When cajeputol is treated with the pentasulphide, it yields a mixture of terpene and cymene, the latter being formed by a secondary action of the pentasulphide or the terpene. This was shewn to be the case by treating the terpene from oil of turpentine and hesperidene with the pentasulphide, when cymene was formed in both cases.

GEOLOGICAL SOCIETY.

April 15th.—J. Evans, Esq., President, in the chair. Mr. H. M. Whitehead was elected a fellow. The following communications were read:—"About Polar Glaciation," by Mr. J. F. Campbell; and "Note regarding the Occurrence of Jade in the Karakash Valley, on the Southern Borders of Turkestan," by Dr. F. Stoliczka.

SOCIETY OF ANTIQUARIES.

April 23rd.—Anniversary Meeting.—The following were elected council and officers for the ensuing year:—Eleven members of the old council were re-chosen of the new council, as follows: The Right Hon. the Earl Stanhope, President; J. Winter Jones, Vice-President; C. S. Perceval, Treasurer; A. W. Franks, Director; J. Evans and G. L. Gower, Auditors; F. Ouvry, H. Reeve, and W. M. Wylie. Ten of the other Fellows were chosen of the new council, namely, E. Freshfield, Auditor; C. D. E. Fortnum, Rev. C. O. Goodford, P. C. Hardwick, Baron Heath, T. Lewin, H. S. Milman, Lord Redesdale, W. Smith, Sir H. M. Vavasour, Bart. C. K. Watson was re-elected Secretary. The President delivered an address, containing the usual obituary notices of Fellows deceased during the past year. Resolutions were passed expressive of the great regret felt by the Society at the retirement of Mr. Ouvry from the office of Treasurer, and at the death of their late Fellow and some time Director, Mr. Albert Way, who, in his last illness, had expressed a wish that 150 volumes from his library should be given to the society. To this wish the Honourable Mrs. Way had, in the most cordial manner, given effect.

ANTHROPOLOGICAL INSTITUTE.

April 14th.—Prof. Busk, President, in the chair. Mr. W. Stoate was elected a Member. Mr J Brent exhibited and described a series of flint implements from Canterbury and Reculver. A description, by Mr. Howorth, was read on an Ashanti fetish letter or curse. The document, which was lent by Capt. Gordon for exhibition, was written in the Arabic character, and in the language of the Barbu tribe, on a sheet of rough paper of large foolscap size, folded about two inches square, and tied with green thread The letter contained a prayer that the English might fight among themselves and return to the coast, and that pestilence might overtake them. The Ashanti grievances were enumerated, and it stated that the white man came with covetous eyes and seized the land, and that covetousness brought down the curses of Suleiman, the high priest. It was thought by the English scouts that it was Suleiman himself who endeavoured to stay the British troops on their approach by throwing down the fetish, and that his failure would probably cost him his life. Capt. S. P. Oliver contributed a series of papers "On the Non-historic Stone Relics of the Mediterranean." The series comprised full accounts, with ample illustrations, of the Torre dei Giganti, Malta, Tumuli near Smyrna, Dolmen-Mounds of the Albegna, Sardinian Nuragghis, and the Sepolture de is Gigantes of Sardinia.

March 28th.—Prof. Busk, President, in the chair.—Mr. C. C. Tennant was elected as a Member. Mr. H. H. Howorth read a paper, "Strictures on Darwinism, Part III., on Gradual Variation." The paper was in continuation of a series in which the author endeavoured to show that Mr. Darwin's main conclusion is not supported by the evidence of the changes in type that can be examined. Mr. Darwin differed from the older naturalists in assigning as the cause of variation a struggle between the individuals of a class for existence, by which a favoured individual and its progeny eventually survive. They, on the contrary, argued that variation is induced by a change in the external conditions of climate, food, &c., which operate upon the whole class together, and make it change, as a whole, in a certain definite manner and direction,—that is, in one which can be actually predicted; so that if any individual of a class, or any number of individuals of a class, be subjected to a certain alteration of conditions, a certain definite and uniform change will be produced in the individual or the class. Again, if the new conditions were annihilated, the object of the experiment is reverted to its original surroundings. The author supported that argument by a large number of facts, and, in doing so, was constrained to conclude that the operating cause of variation in man, as in the case of plants and animals, is the working of external causes; and that an individual with its progeny is not so much better fitted for enduring the new conditions that it eventually supplants the rest, but rather that the whole class is moulded together into a new shape, which is called a new variety. Some facts were drawn from the experience of history, showing that where the conditions have been uniform, as in Egypt, although there has been a considerable mutual pressure among the individuals of a class for food, &c., yet there has been no variation; while a transplanting of similar individuals, as in the case of European emigration to America, has been followed by almost immediate change. The illustrations that might be drawn from the cases of man, as in the changes that have ensued in both the Aryan and the Black Emigrants to North America, in the Dutch at the Cape, in the Portuguese at South America, &c., were notable and telling instances of the operation of the law argued for by the author, inasmuch as changes of type of a marked character have occurred where there has been neither time nor opportunity for the creation of a fresh type by the successive amelioration or change in the idiosyncrasies of the descendants of a common ancestor, but where the change has undoubtedly occurred in the whole class together over a very wide area.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

May 5th.—Dr. Birch, President, in the chair. The following candidates were elected Members:—Miss E. Bagster, Messrs. H. Bland, W. Boscawen, jun., J. Dryden, J. H. Lydall, Rev. J. M. Fuller, and Rev. Canon Lance. The following papers were read:—"Synchronous History of Assyria and Judah, B.C. 745-688," by Mr. J. W. Bosanquet, Treasurer. "Revised Translation of the Descent of Ishtar, with a further Commentary," by Mr. H. Fox Talbot. In this paper the learned Assyriologist showed that the Legend of the Descent of Ishtar was, in its present form, dramatically arranged as a species of Mystery or Miracle Play. The translator was not able to render the whole text more complete by the addition of a fragment of a duplicate copy, containing ten lines, recently found by Mr. G. Smith in the British Museum. "On the Egyptian Altar at Turin," drawn by Mr. J. Bonomi, and described by Mr. S. Sharpe. "Translation of the Hieroglyphic Inscription upon the Granite Altar at Turin," by Dr. S. Birch, President.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

April 22nd.—Council Meeting.—G. R. Wright, Esq., in the chair. The list of the Officers and Council for the ensuing year, to be submitted to the Annual General Meeting in May, was read and approved, and an announcement made from the chair that K. D. Hodgson, Esq., M.P., would preside at the Annual Congress to be holden at Bristol, from the 4th to the 10th August next, succeeding to the Duke of Norfolk as President of the Association. It was also announced that the services of Mr. J. Reynolds had been retained as Honorary Local Secretary for the forthcoming Congress.—Evening Meeting.—The Rev. S. Mayhew, M.A., in the chair. An exhibition of Early English and Later Dutch Pottery, with some specimens of Venetian Glass, was made by Messrs. E. Roberts, Bailey, and Mayhew; and afterwards a paper was read by Mr. H. Syer-Cuming, on the origin of and causes which led to the Nine of Diamonds being called the Curse of Scotland. This subject of inquiry produced a discussion, in which the Chairman, Messrs. S. J. Tucker, Rouge, Croix, R. N. Philips, D.C.L., E. Roberts, and Wright, took part. A paper was read, "On the Discovery of an Ancient British Interment, near Beddington Park, Surrey," by Mr. E. P. L. Brock.

METEOROLOGICAL SOCIETY.

April 15th.—Dr. R. J. Mann, President, in the chair.—Rev. C. Gape, Dr. R. Lord, Messrs. T. W. Baker, F. Green, F. J. Sparks, and G. M. Whipple, were elected Fellows. The following papers were read:—"On the Climate of Patras, Greece," by the Rev. H. A. Boys. The author shows that the climate of Patras is naturally mild and relaxing, seldom disagreeably dry, and not often very damp, being, indeed, drier by a good deal than any part of England. "Remarks on the Atlantic Hurricane of August 20th to 24th, 1873," by Mr. W. R. Birt. "On the Meteorology of December in the Southernmost Part of the South Indian Ocean," by Mr. R. H. Scott. This paper had been prepared expressly to give information on the climate of Kerguelen Island to those gentlemen who are going out to observe the Transit of Venus in December next. "On the Diurnal Variations of the Barometer," by Mr. J. K. Laughton. Whilst it has long been well known that barometric maxima and minima recur daily with unfailing regularity, especially within the tropics, the cause of this recurrence is yet unknown; and though it has been attributed to the different temperatures and humidity at different times of the day, such explanation is far from satisfactory, for the maxima occur at the times of mean temperature and humidity, without regard to the direction of the change; and the minima occur indifferently at the times of both greatest and least temperature and humidity. It seems that an explanation is rather to be found in the inertia of the atmosphere, which, in the first instance, permits the air to have its elastic force increased by a rapidly increasing temperature before the inertia of rest can be overcome sufficiently to allow it to enlarge its volume in due proportion; but that when that inertia of rest is overcome, then the inertia of motion permits it to move away from the place of observation in excess of what is due to the increased elasticity, the nocturnal maximum and minimum being caused by the resilient power of the air, which gives it alternately an inward and outward motion, and each way, in excess of what is due to the decrease or increase of elasticity, by reason of the inertia of motion. If this explanation is correct, we ought to find a certain tendency of the wind towards east in the morning and towards west in the evening; and this tendency does seem to be shown in the very few published observations which permit a comparison to be made. Further observations, as confirming or disproving the proposed theory, are much to be desired.

LINNEAN SOCIETY.

April 16th.--H Trimen, Esq., in the chair. --Mr. G. E. Dobson was elected a fellow.—Dr. Masters, Mr. G. Maw, and Mr. Hiern were chosen to represent the Society at the International Horticultural and Botanical Congress, to be held at Florence in May.—Prof. Oliver exhibited a remarkable fruit of Du boscia, obtained from Coomassie. Mr A. Murray exhibited some interesting specimens of silicified wood, from North-west America Mr. J. G. Baker exhibited a Cheilanthes, from New Granada, identical with *C. Dalhousiæ*, from the Himalayas. Prof. Thiselton-Dyer exhibited some striking fruits of Dipterocarpeæ. The following papers were read:--"Contributions to the Botany of H.M.S. Challenger Expedition, Nos. III.-XIV."

MRS. LEWIS'S COOKING APPARATUS FOR FOOD REFORM.

The address, in lieu of a paper, delivered by Mrs. Amelia Lewis, with the discussion therein, at the meeting of the Inventors' Institute on 30th April, 1874, are, in substance, as follows:—

After some general observations on the importance of the art of cooking, and of the application of scientific principles to the system of, and apparatus and appliances for, carrying on the operations of cookery, Mrs. Lewis stated that the main object she had in view was the practical improvement of the preparation of the food of the humbler classes of society. Her stove and its appliances which she had devised, with the assistance of a very clever mechanical man, were on the principle of the ancient brazier, her description of brazier being a simple mechanical contrivance made to turn so as to regulate the draft, and consequently the expenditure of fuel. A strong fire could be obtained by this means; or the coal or peat which is used—for it will burn either—can be reduced almost to a spark—a great desideratum, not only in warm weather for the well-to-do, but one which will, no doubt, be highly prized by the poor on account of the saving thereby attained. For cheapness and cleanliness, however, she much preferred peat fuel. By using that particular sort of stove the room was warmed equally in all parts—a most essential thing to health—and persons were not frozen upon one side and scorched upon the other. (Cheers and laughter.) Another among many advantages which it possessed was that it emitted no smoke. One of the greatest elements in preserving good health was to have an equal temperature in our houses. Whether in the cottage or the mansion, it was of the utmost importance to preserve the apartments at one heating point, and to attain that they must look to science, for science had been very beneficent, but art had been truly selfish; science, worked on large general rules and certain principles; art, however, upon the other hand, mostly went back to the individual. With respect to cooking and heating our homes, science had done but little as yet in this country, but she was glad to be able to say that there was a grand awakening with respect to these all important matters. (Cheers.) She had devoted herself to the proper manner of preparing food, and it was a question, she thought, which was one of the grandest that could occupy any woman's attention. (Cheers.) If we had a better system of cooking, we should find pauperism lessened, lunacy lessened, vice and crime lessened, drunkenness almost made impossible, and our hospitals not half so full as they were at present. (Cheers.) She did not object to hospitals, for why should she, as they did so much good? but she was of opinion if some of the money which was obtained on Hospital Sunday could be devoted to giving the people the means of obtaining good and wholesome food it would do an enormous amount of good. (Cheers.) It should be borne in mind that the human machine would only go according to the quality and substance of the food which was put into it. If we had not oxygen and hydrogen, and nitrogen and phosphorus, and other matters supplied to the system in properly cooked food, we could not possibly preserve our bodies or our minds in a healthy state. It might be said the people could not obtain all this, which however, was nonsense. She believed in poor people, but she did not believe in badly-fed people or starving people in a land of plenty. The fact was, that infinitely too much was expended at the present time in food, and the manner in which it was prepared was wasteful in the extreme. People now put their vegetables, their meats, and their fish into water, and boiled or stewed them until most of the nutritive portions of them had been absorbed in that element. The same thing might be said with regard to roasting and baking. These processes were equally deleterious, for they only hardened the meat and destroyed its juices. The only mode of cooking properly so as to obtain every particle of nourishment the various edibles contained was either by steaming or allowing the live flame in a covered pan to get near them. Mrs. Lewis here gave one of her recipes for cooking fresh herrings, which she assured those present would be found to add much to the natural fine flavour of the fish, and prevent it causing indigestion. The plan she recommended was to steam it in vinegar and water, when it would be found that an infant or sick person might eat it without any ill effects. (Hear, hear.) If the women knew only how to cook properly they would not have their husbands grumbling, as they now sometimes did, for they would not be suffering from indigestion, neither would they have their children beaten or upbraided by the schoolmaster for what was considered inattention, when in reality the poor little things were suffering from badly cooked food. (Hear, hear, and cheers.) What was required in order to bring about a better state of things was for the School Board to take the question up theoretically, and some other body practically. There was no good trying to cook properly without theory, for it might just as well be said that a scientific man could get on without theory. (Hear, hear.) Food and condiments from abroad she strongly set her face against, especially for ladies, as their use produced in many instances the number of pale faces they exhibited. Soup, too, taken before dinner was a barbarism that no enlightened person should be guilty of. In conclusion, she said she had not so much to do with the higher classes as with the poor, although she had much to say to them What she wanted to see was the working man's home made what it ought to be, comfortable, and she could assure all present that once such a stove as the one she had used that evening was introduced into a man's home it became quite a different dwelling. (Cheers.)

Practical public testing of her system is the plan on which Mrs. Lewis likes to proceed, and hence she had fitted up in the Institute's rooms two of her stoves, which, during the progress of her address, were kept in operation; and the rapidity of heat raising, getting up steam, and cooking effect were very remarkable. In a very few minutes the kettle was "singing," and, after a few more had passed, the pot, or rather cylinder, was boiling. This cylinder was about two feet high and something like a foot in diameter, and the interior was fitted with shelves, the object being to support a description of tin cullender, and these in turn hold the various vegetables. Three of these apparatuses were placed over the others in the steamer, the first containing a cauliflower, the next some potatoes, and the third turnips. Then, again, in a second pan were placed some fish, all of which turned out admirably, under the superintendence of the distinguished *chef*. The cauliflower was beautifully white, and the potatoes were like "balls of flour," but the most delicious of all were the turnips. These latter, by the mode in which they were treated, were neither watery nor spongy, but firm; and, what is more important, retained all their saccharine matter. Sausages, too, were also prepared, and gave entire satisfaction to everyone who partook of them. It may be a fact worthy of note that the whole cost of keeping a coal fire going in one of these patent stoves from seven in the morning until eleven at night costs but 2½d. This fact alone ought to be sufficient, even if there were no other advantages to be obtained by them, to ensure their success.

The Chairman (Dr. Hardwicke) said he felt great pleasure in again coming amongst the members of the Inventors' Institute, for he considered that by doing so he was co-operating with those who were working in a practical way for the advancement of the true civilized life. As a sanitarian, he necessarily took a deep interest in the preparation of food, and he considered it very hopeful for the cause of health and life to find a lady of education and talent like Mrs. Lewis coming forward to promote improvement in the art of cookery, and essaying to give to it a foremost place in what in modern speech are termed technical sciences. Though he thought very highly of Mrs. Lewis's system and apparatus, and he fancied the audience held the same opinion, still, like every other invention, practical use and repeated trials were necessary to enable any one to pronounce a conclusive opinion, and some persons would require trials to be made, not in a well-ventilated room like that in which they were assembled, but in the close rooms and small cottages inhabited by the humbler classes, though, for that matter, if Mrs. Lewis's invention led people to let into their dwellings more fresh air, he should be highly pleased, and should consider it a great recommendation of the system. As he knew they were all there rather to take part in a practical investigation of this matter than to hear speeches, he would not detain them by any further remarks of his own.

Mr. Varley remarked that no subject demanded greater consideration at the present time than the economy of food; fuel and food both being very dear. The action of heat on raw substances was well worthy of scientific investigation, and he considered they were specially fortunate in having one so able to aid in this investigation, and capable of giving the subject a pleasant turn as Mrs. Lewis, and he would take leave to ask those present to vote her their thanks for her admirable address and demonstration that evening.

Mr. A. J. Murray seconded this, but would call upon some of those present to state their views on the subject.

Mr. Yates said that having for years resided in Germany, he fully recognized the waste that goes on in the ordinary English cooking system, and as an engineer and mechanician, he must say that Mrs. Lewis's invention was of a most promising character. He sincerely hoped she would meet with the success she so well deserved.

Mr. Mottershead remarked that if Mrs. Lewis's invention depended upon peat, he feared it would be a difficulty in the way of the success of the invention, for peat was a fuel obtainable only in a few parts of the country.

Mr. WILSON thought there were some points which ought to be considered before a decisive opinion could be given. Was steaming better than baking or roasting? Still Mrs. Lewis's apparatus was certainly a great addition to our cooking arrangements.

The vote was unanimously passed amidst much cheering.

Mrs. LEWIS responded, and then

Mr. CAMPIN (the Secretary) proposed a vote of thanks to Dr. Hardwicke, who had kindly taken the chair at that meeting. They all knew his important and pressing avocations left him but little time to spare, and they must have felt how much this important subject had been assisted by Dr. Hardwicke's presence in the chair. No one could have done more to bring out the points of advantage and utility embraced by Mrs. Lewis's valuable contribution to the important subject of cooking reform.

This was seconded by Mr. CARTTAR, and having been passed unanimously and acknowledged, the meeting ended.

APPLICATIONS FOR LETTERS PATENT.

(Continued from page 78.)

employed therein (com).—W. R. Lake. Air-tight joints for gas retorts (com.) (Complete specification).—G. T. Bousfield. Rock drilling machines (com.)—G. and H. Agar. Wind and rain impervious door plinth.—H. Benjamin. Extraction of oleaginous matters from wool washing suds or other liquids containing soapy matters or grease and the production of tallow or oil from the resulting substances.—H. A. Bonneville. Apparatus for the manufacture and application of wire coverings for securing the corks of bottles containing sparkling wines, or other fermented or effervescent liquids (com.) (Complete specification) —D. Hipkins. Method of manufacturing artificial butter and of clarifying or purifying rancid butter.—W. C. Wingfield.—Portable court for playing the ancient game of tennis.—J. H. Betteley. Stopping and starting tramway cars.—S. H. Johnson, F.C.S. Construction of furnaces and retorts for the manufacture of bisulphide of carbon.—G. W. Baker. Sewing machines.

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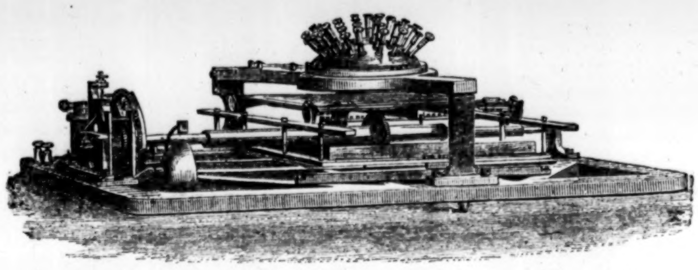

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